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ABSTRACT

This curriculum guide consists of instructional materials for teaching 3rd, 4th, and 5th grade students about farming and the important role agriculture has had in the history and economy of North Dakota. The activities can be used to enhance the teaching of language arts, art, social studies, and science. The guide covers many aspects of agriculture, including farms, farmers, wheat, livestock, other North Dakota crops, soil, chemicals, farm machinery and inventions, railroads, and marketing. Each topic includes: (1) lesson plans describing supplies needed, background information and procedures, and learning activities; (2) task-card shapes (images) and activities that can be used for independent research projects, creative writing book covers, bulletin board shapes, or for mounting poetry or handwriting; (3) games designed to reinforce vocabulary and specific concepts of agriculture topics covered in the curriculum; (4) word hunts; and (5) poetry with agricultural themes that can be used for studying metaphors and similes, introducing a lesson, practicing handwriting, or stimulating students to write poetry about farming. Includes answer sheets and useful references. (LP)

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CREATIVE WAYS TO CULTIVATE AGRICULTURE

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IN THE CLASSROOM

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NORTH DAKOTA DEPARTMENT OF AGRICULTURE

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WARD T. SCHAFER
GOVERNOR

State of North Dakota
OFFICE OF THE GOVERNOR
600 E. Boulevard - Ground Floor
BISMARCK, NORTH DAKOTA 58505-0001
(701) 224-2200

Dear Educator,

AG in the CLASSROOM is part of a national program to encourage teachers to include information about agriculture in their curriculum.

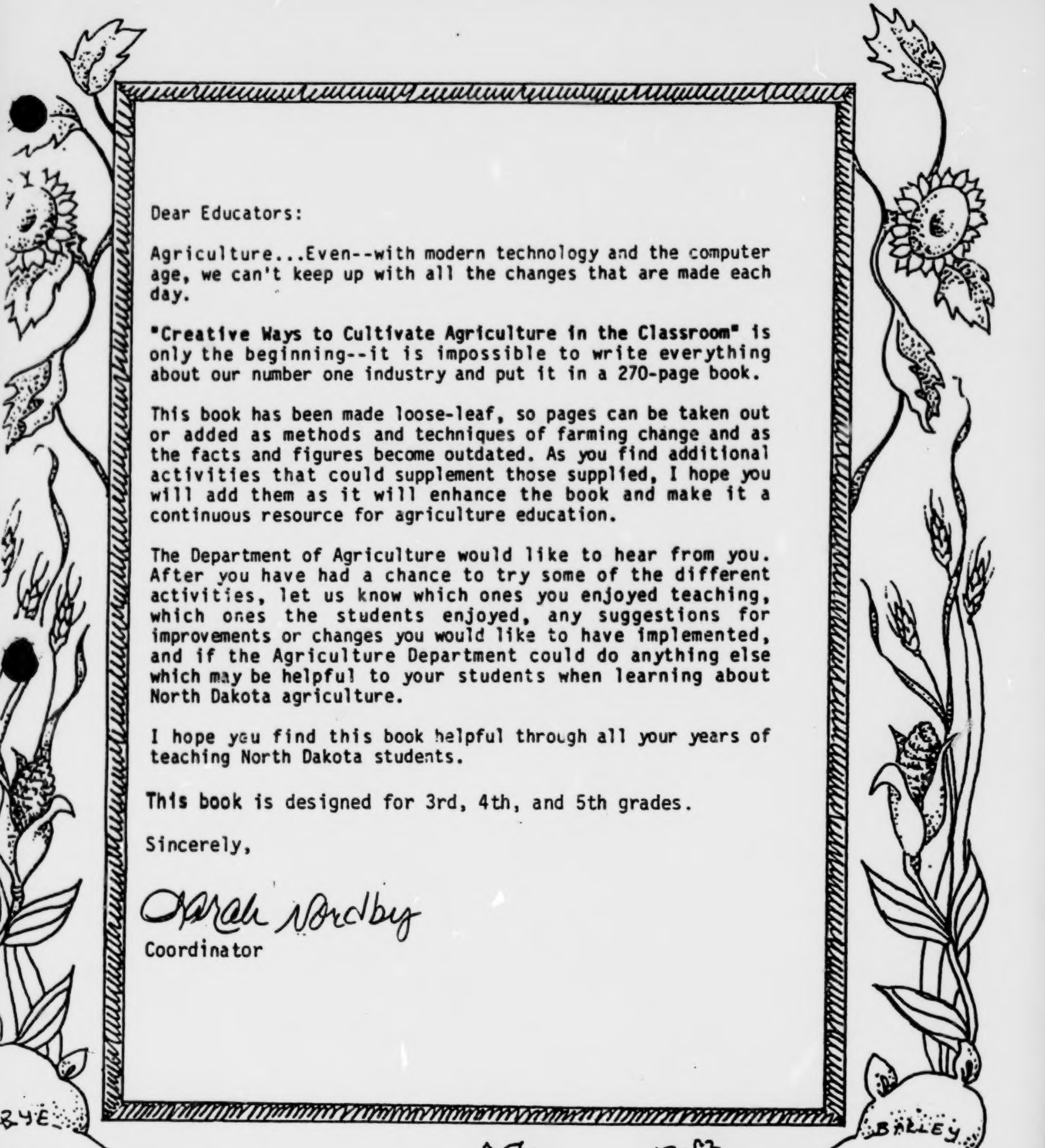
This book, developed by the North Dakota Department of Agriculture, is a useful tool in helping our students learn more about farming and the important role of the people who produce our food.

I encourage North Dakota teachers to use AG in the CLASSROOM to ensure that students understand this significant segment of our economy and make the study of agriculture a worthwhile experience.

Sincerely,

Edward T. Schafer

Edward T. Schafer
Governor



Dear Educators:

Agriculture...Even--with modern technology and the computer age, we can't keep up with all the changes that are made each day.

"Creative Ways to Cultivate Agriculture in the Classroom" is only the beginning--it is impossible to write everything about our number one industry and put it in a 270-page book.

This book has been made loose-leaf, so pages can be taken out or added as methods and techniques of farming change and as the facts and figures become outdated. As you find additional activities that could supplement those supplied, I hope you will add them as it will enhance the book and make it a continuous resource for agriculture education.

The Department of Agriculture would like to hear from you. After you have had a chance to try some of the different activities, let us know which ones you enjoyed teaching, which ones the students enjoyed, any suggestions for improvements or changes you would like to have implemented, and if the Agriculture Department could do anything else which may be helpful to your students when learning about North Dakota agriculture.

I hope you find this book helpful through all your years of teaching North Dakota students.

This book is designed for 3rd, 4th, and 5th grades.

Sincerely,

Sarah Nordby
Coordinator

"CREATIVE WAYS TO CULTIVATE AGRICULTURE IN THE CLASSROOM" HAS BEEN MADE POSSIBLE BY CONTRIBUTIONS FROM THE FOLLOWING:

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North Dakota Barley Council
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North Dakota State Wheat Commission

Red River Valley Potato Growers Association

North Dakota Farm Bureau

Adams County Farm Bureau

Cavalier County Farm Bureau

Grant County Farm Bureau

Kidder County Farm Bureau

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North Dakota Farmers Union

North Dakota Beef Commission

Red River Edible Bean Growers Association

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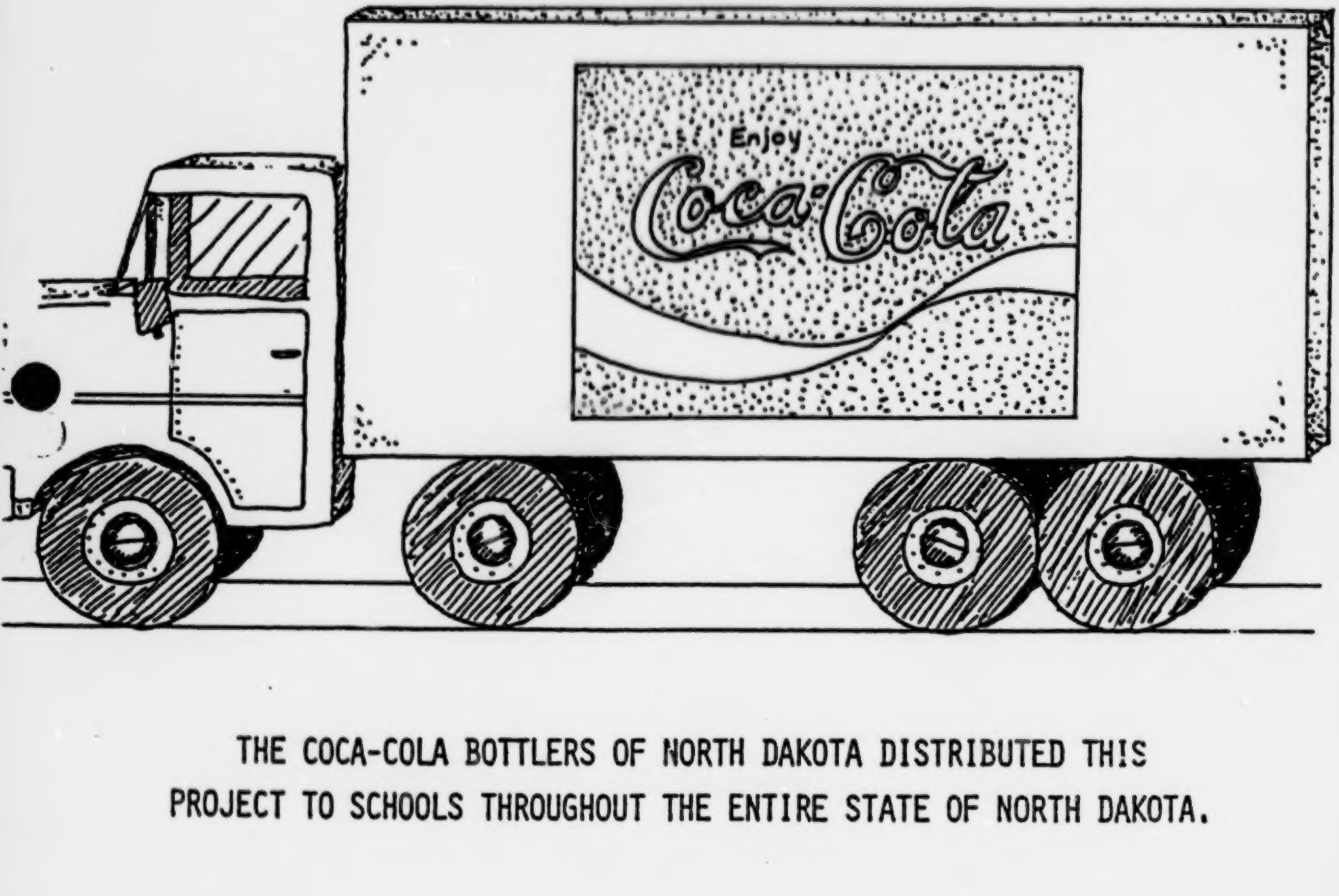
WE WISH TO THANK THE COCA-COLA BOTTLERS OF NORTH DAKOTA FOR THEIR INTEREST IN THIS PROJECT.



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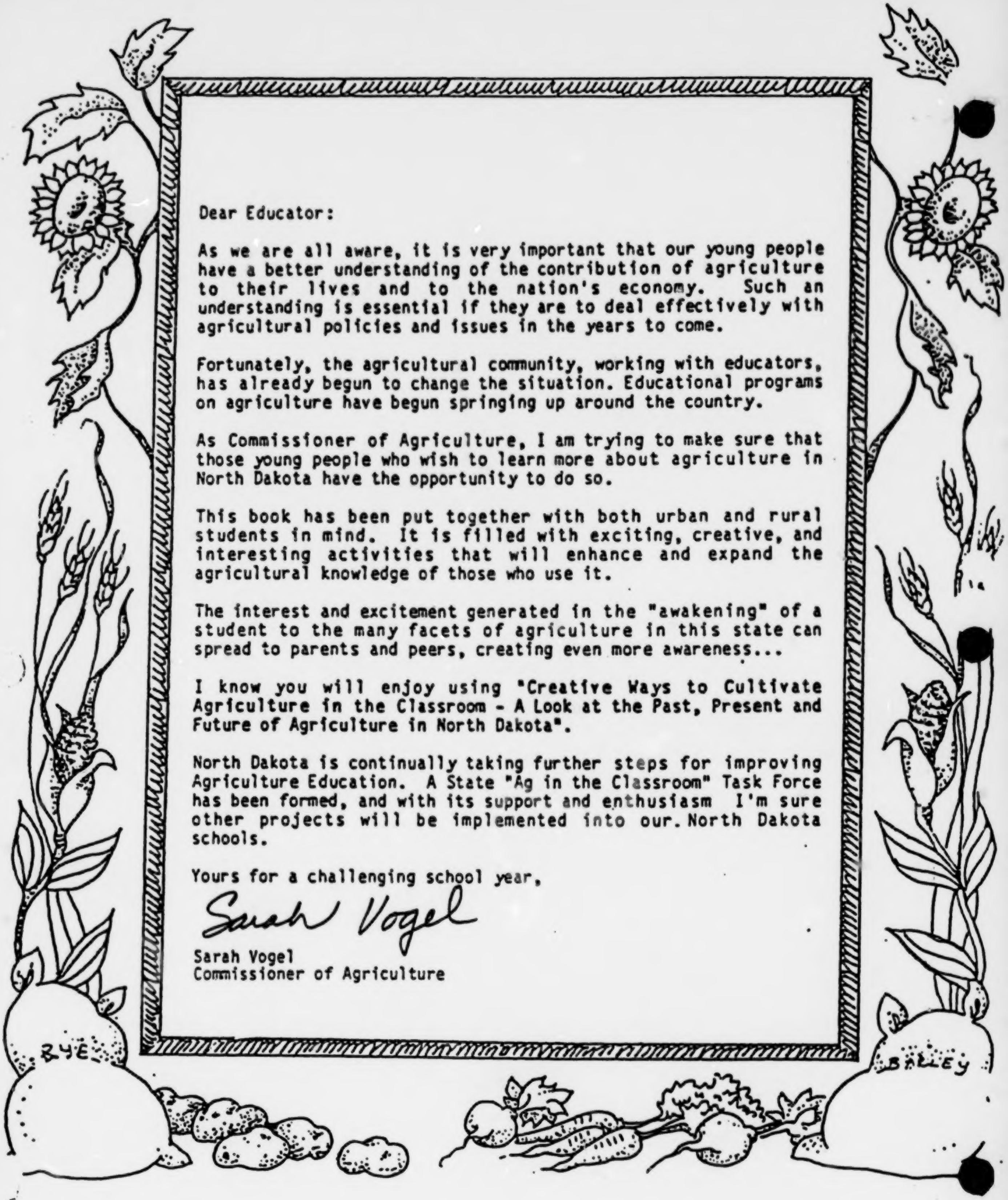


Dear Educator:

As we are all aware, it is very important that our young people have a better understanding of the contribution of agriculture to their lives and to the nation's economy. Such an understanding is essential if they are to deal effectively with agricultural policies and issues in the years to come.

Fortunately, the agricultural community, working with educators, has already begun to change the situation. Educational programs on agriculture have begun springing up around the country.

As Commissioner of Agriculture, I am trying to make sure that those young people who wish to learn more about agriculture in North Dakota have the opportunity to do so.

This book has been put together with both urban and rural students in mind. It is filled with exciting, creative, and interesting activities that will enhance and expand the agricultural knowledge of those who use it.

The interest and excitement generated in the "awakening" of a student to the many facets of agriculture in this state can spread to parents and peers, creating even more awareness...

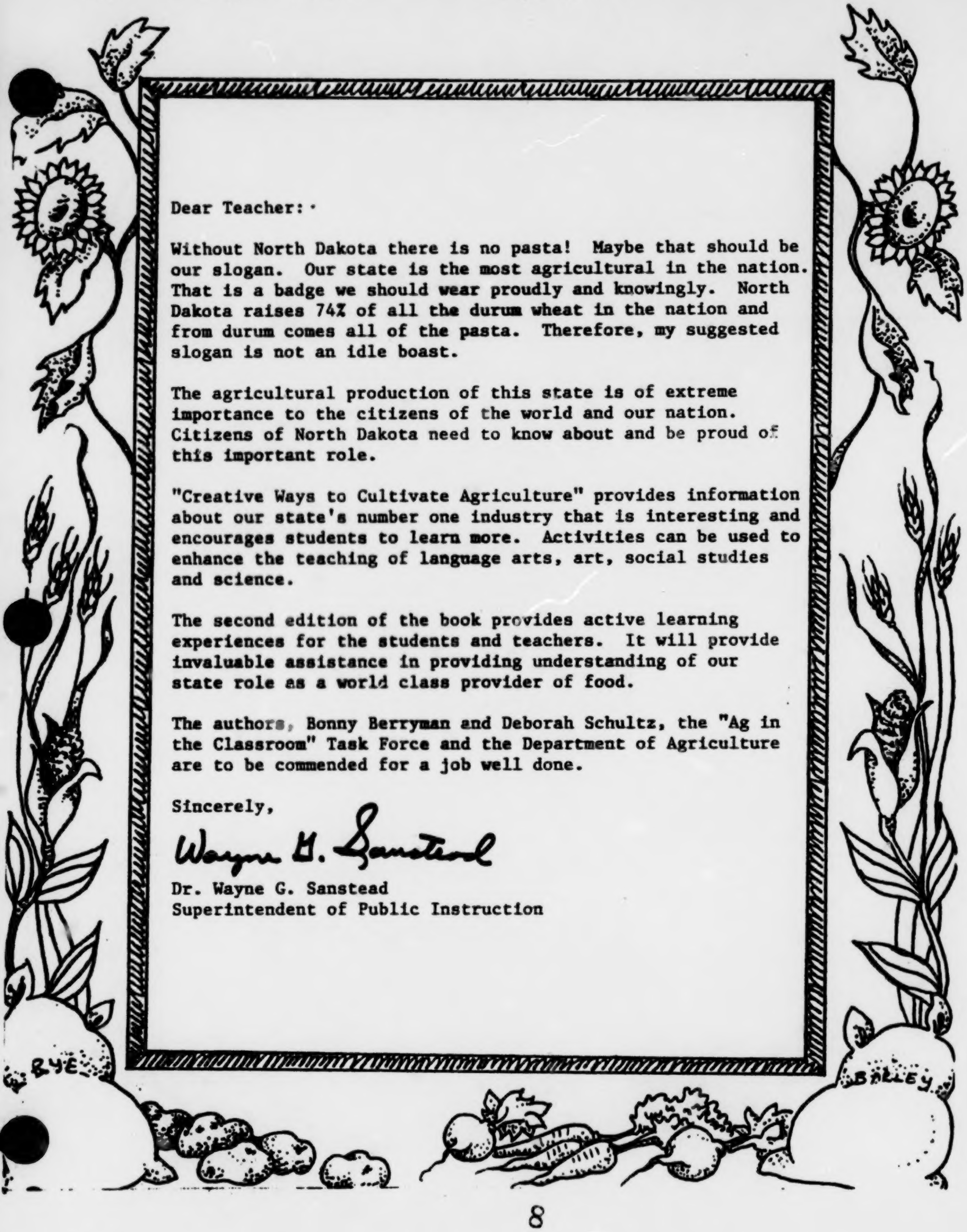
I know you will enjoy using "Creative Ways to Cultivate Agriculture in the Classroom - A Look at the Past, Present and Future of Agriculture in North Dakota".

North Dakota is continually taking further steps for improving Agriculture Education. A State "Ag in the Classroom" Task Force has been formed, and with its support and enthusiasm I'm sure other projects will be implemented into our. North Dakota schools.

Yours for a challenging school year,

Sarah Vogel

Sarah Vogel
Commissioner of Agriculture



Dear Teacher:

Without North Dakota there is no pasta! Maybe that should be our slogan. Our state is the most agricultural in the nation. That is a badge we should wear proudly and knowingly. North Dakota raises 74% of all the durum wheat in the nation and from durum comes all of the pasta. Therefore, my suggested slogan is not an idle boast.

The agricultural production of this state is of extreme importance to the citizens of the world and our nation. Citizens of North Dakota need to know about and be proud of this important role.

"Creative Ways to Cultivate Agriculture" provides information about our state's number one industry that is interesting and encourages students to learn more. Activities can be used to enhance the teaching of language arts, art, social studies and science.

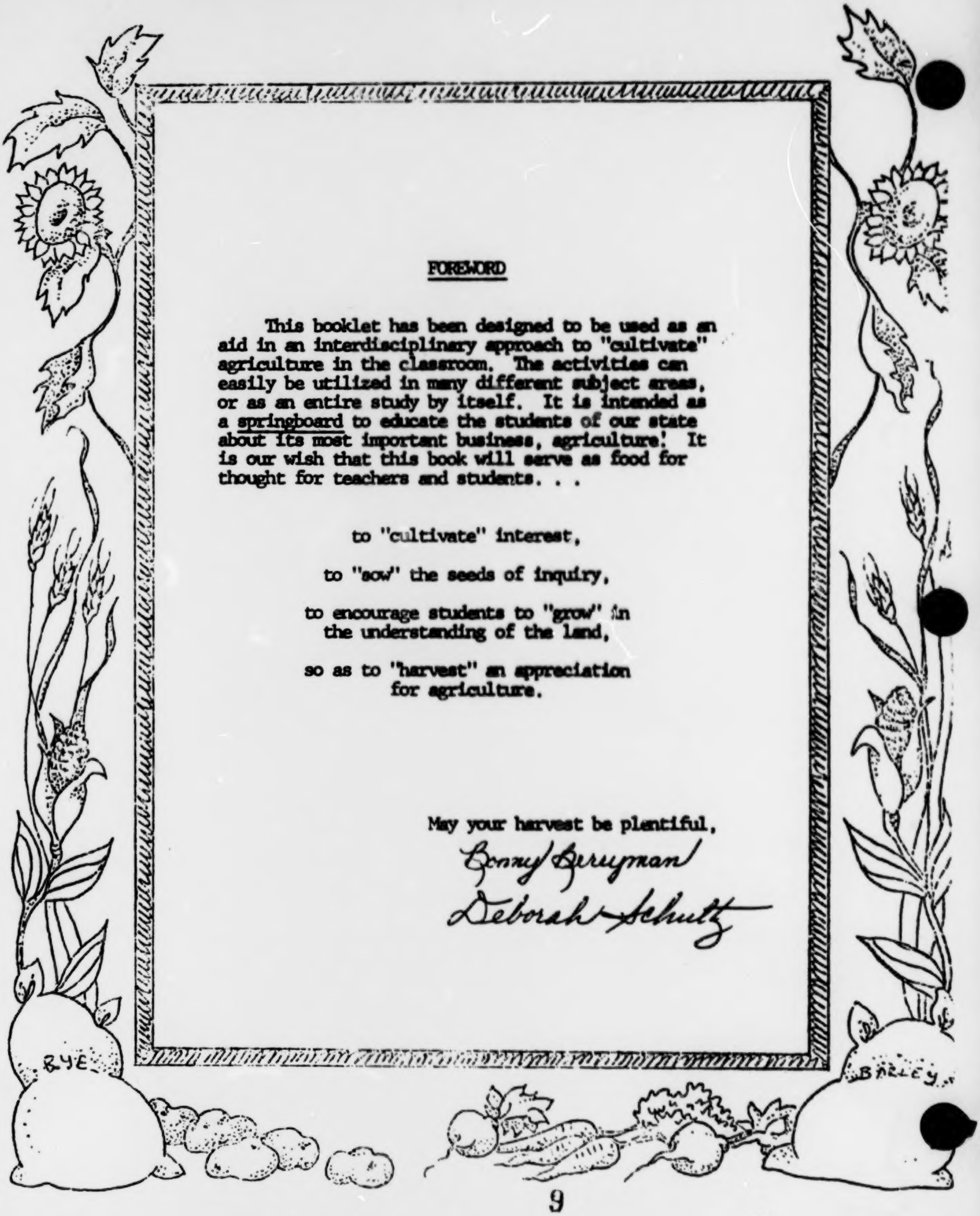
The second edition of the book provides active learning experiences for the students and teachers. It will provide invaluable assistance in providing understanding of our state role as a world class provider of food.

The authors, Bonny Berryman and Deborah Schultz, the "Ag in the Classroom" Task Force and the Department of Agriculture are to be commended for a job well done.

Sincerely,

Wayne G. Sanstead

Dr. Wayne G. Sanstead
Superintendent of Public Instruction



FOREWORD

This booklet has been designed to be used as an aid in an interdisciplinary approach to "cultivate" agriculture in the classroom. The activities can easily be utilized in many different subject areas, or as an entire study by itself. It is intended as a springboard to educate the students of our state about its most important business, agriculture! It is our wish that this book will serve as food for thought for teachers and students. . .

to "cultivate" interest,

to "sow" the seeds of inquiry,

to encourage students to "grow" in
the understanding of the land,

so as to "harvest" an appreciation
for agriculture.

May your harvest be plentiful,

Bonny Berryman

Deborah Schultz

INTRODUCTION

The following information is a listing and a description of the kinds of activities found in Creative Ways to Cultivate Agriculture in the Classroom.

I. Lesson Plans

Some lessons are simply one page designed to be used by the students while other activities require more teacher-directed preparation.

A. Supplies:

Under this heading special materials are listed required for each lesson.

B. Introduction:

This paragraph is designed to provide background information for the teacher. The information could also be shared with the students to stimulate their interest as the activity is introduced.
Other ideas for use of the introduction are:

1. Handwriting lessons
2. Compile several or all in booklet form with student illustrations
3. Mount on task card shapes and place in the Farming Center.
4. Use information in the student newspaper entitled, Grassroots Reporter
5. A topic of study for individual research

C. Procedure

The steps given in the Procedure are simply one way in which the teacher may present the lesson. Teachers should feel free to alter the lesson according to the individual needs of their students.

D. This section provides teachers with a listing of extended activities which can be used by individual students who desire further study of a particular topic.

II. Task Cards

Provided throughout the book are various task card shapes and activities. Some of the activities lend themselves to further study while others are simply a paragraph of information your students may find interesting. Mount the task card activities onto the designated shapes. There are many other ways to use the shapes:

A. Independent research activities

B. Creative writing book covers

C. Bulletin board shapes

D. Mounting poetry or handwriting

E. Vocabulary words

F. Your own ideas

III. Vocabulary Games

The vocabulary games are designed to reinforce vocabulary and specific concepts of various agriculture topics discussed in this book.

IV. Word Hunts

The word hunts may be mounted and placed at the Agriculture Center as an independent activity for the students.

V. Poetry

The authors wish to thank Florence F. Renfrow for the poetry provided throughout this book. It is their feeling that this North Dakota poet is very much in touch with the influence that agriculture has played in the past, is playing in the present, and will play in the future of North Dakota. This poet has authored the following book:

Poems from North Dakota
by Florence R. Renfrow
Adams Press
Chicago
1979

The poetry selections may be used to:

A. Explore agriculture through the affective domain

B. Study poetic tools such as metaphors, similes and alliterations

C. Introduce a lesson

D. Develop choral reading

E. Practice handwriting

F. Illustrate agricultural scenes from the poems

G. Stimulate students to write poetry about farming

H. Compile a booklet of poems related to North Dakota agriculture

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THE VOCABULARY GAMES

This section contains a vocabulary game for each of the major topics studied throughout this book. Each game includes an illustrated gameboard of 20 vocabulary words and the corresponding definition cards which also serve as the answer key.

The vocabulary games are designed as a means of independent study by students alone or in small groups. If the child is unfamiliar with the topic of the game, he/she may have to do some research in agricultural books, encyclopedias, or the North Dakota Project STUDY booklets.

Game Construction:

1) Reproduce the two pages for each game.

2) Use the illustrated vocabulary page as the gameboard. Mount it on colored construction paper and add color to the drawings.

3) Cut apart the reproduced definition cards in 20 squares. Mount each square on colored construction paper. Save the original copy as the answer key.

4) Put an envelope on the back of each gameboard for storage of the definition cards.

5) Gameboards and definition cards may be laminated or covered with clear contact paper for longer lasting wear.
(HINT: Use different colors of construction paper for each different game. This aids in keeping each game separate and organized).

THE VOCABULARY GAMES continued

Game Directions:

1) Each child needs one gameboard and the corresponding definition cards, stacked face down in front of him/her.

2) Decide who will begin by rolling a die.

3) Draw a definition card from the stack. Read the definition and match it correctly with the vocabulary word by placing the definition card on the proper square of the gameboard.

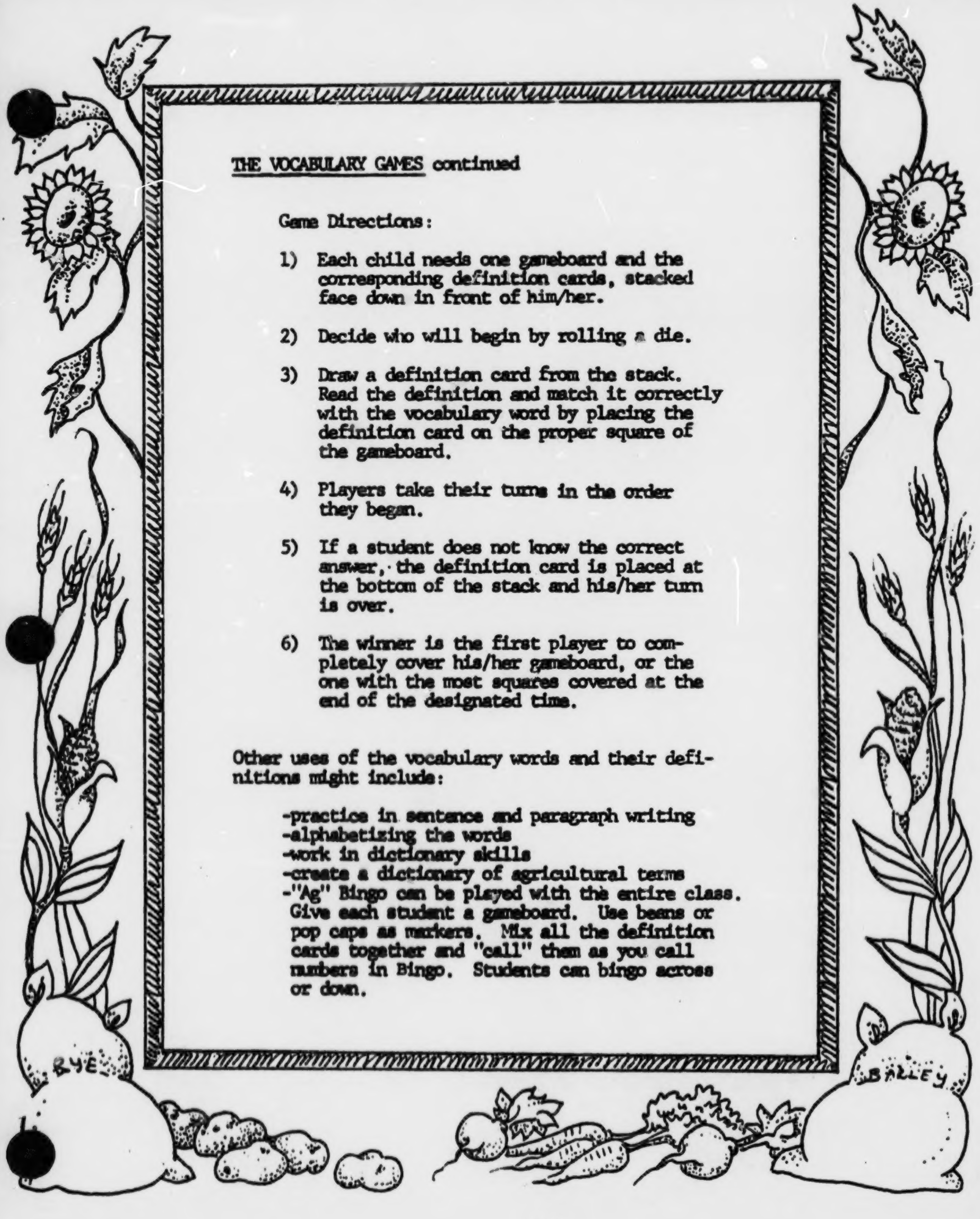
4) Players take their turns in the order they began.

5) If a student does not know the correct answer, the definition card is placed at the bottom of the stack and his/her turn is over.

6) The winner is the first player to completely cover his/her gameboard, or the one with the most squares covered at the end of the designated time.

Other uses of the vocabulary words and their definitions might include:

-practice in sentence and paragraph writing
-alphabetizing the words
-work in dictionary skills
-create a dictionary of agricultural terms
-"Ag" Bingo can be played with the entire class. Give each student a gameboard. Use beans or pop caps as markers. Mix all the definition cards together and "call" them as you call numbers in Bingo. Students can bingo across or down.



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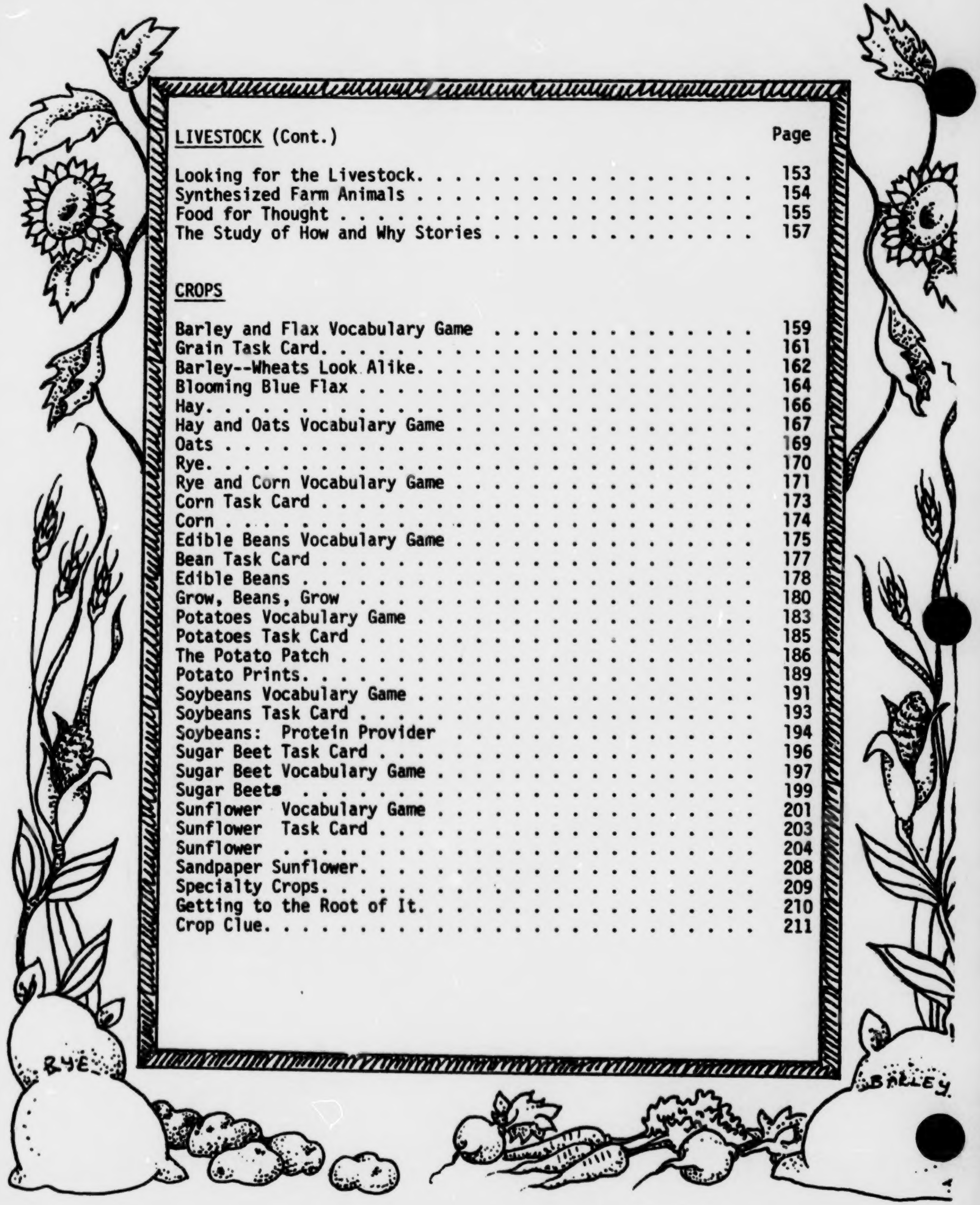

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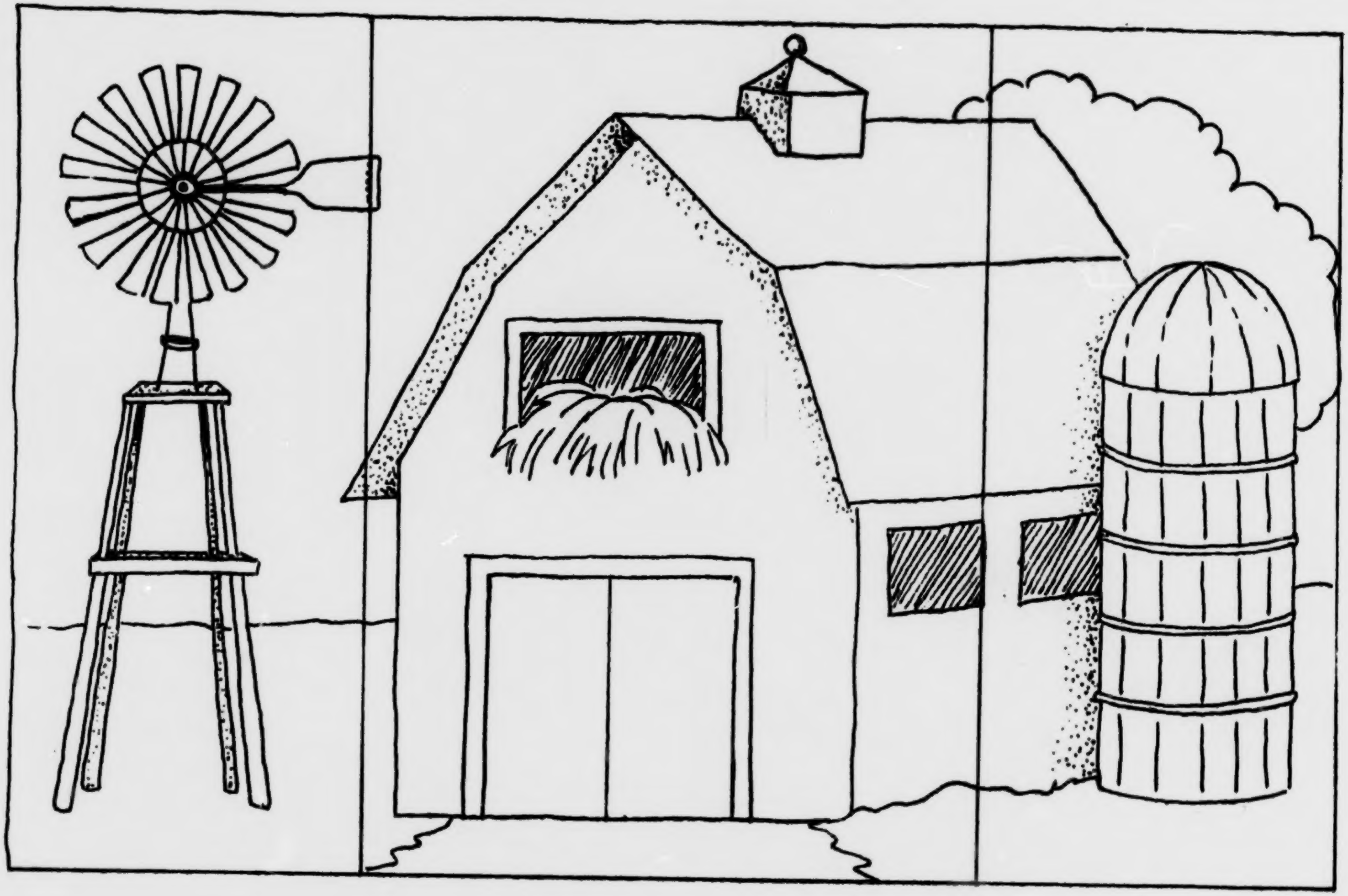


FARMING CENTER

THE FARMING CENTER

(Center or bulletin board display)

The teacher may wish to construct a learning center or bulletin board before teaching any unit from this book, Creative Ways to Cultivate Agriculture in the Classroom. The design on the following page may be used for just that purpose. Making a colorful display and setting aside an interest area in the classroom can do many things to highlight the study of agriculture.

The following center can be used to:

1) Stimulate interest about the various topics of study.

2) Introduce a particular lesson from the book.

3) Be a central location for resources. Check out books and magazines, collect newspaper articles, pamphlets and other reference materials.

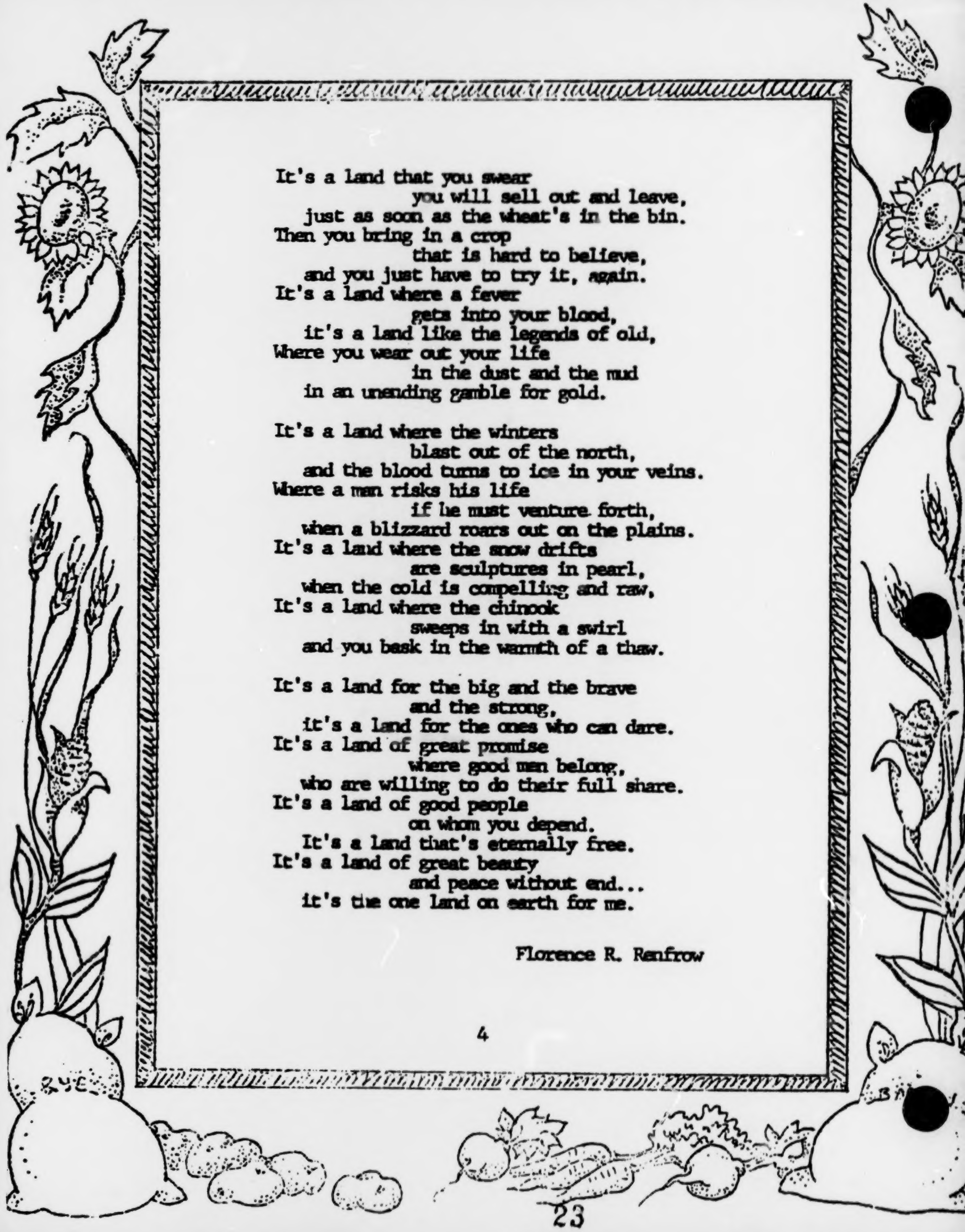
4) Provide an interest area for independent activities provided in this book. It may include task card activities, word hunts, and vocabulary games.

NORTH DAKOTA

There's a land where the prairies
are bound by the sky,
and the west winds eternally blow.
It's a land where the summers
are torrid and dry,
and the winters hit forty below.
It's a land that's been cursed
since the dawning of time,
and a land that is loved by its own.
It's a land for the brave
with a vision sublime
who are willing to try it alone.

You scratch for your living
in dirt, black as sin,
and you work in the wind and the dust.
And you pour out your soul,
as the seeding goes in,
for you plant with a heart full of trust.
You are proud of the broad
blackened acres that lie
and you beam as the first greening shows,
But, beware, for the forces
of nature will try
to destroy every profit that grows.

It's a land where a fortune
is lost in a night,
when a hail-storm sweeps out of the sky.
It's a land where the dry winds
descend in their might
and hope starts to shrivel and die.
Some years, the rains come
and hard times retreat,
those years the crop will come through,
But, most years, grasshoppers
and dust storms and heat
will sap all the strength out of you.



It's a land that you swear
you will sell out and leave,
just as soon as the wheat's in the bin.
Then you bring in a crop
that is hard to believe,
and you just have to try it, again.
It's a land where a fever
gets into your blood,
it's a land like the legends of old,
Where you wear out your life
in the dust and the mud
in an unending gamble for gold.

It's a land where the winters
blast out of the north,
and the blood turns to ice in your veins.
Where a man risks his life
if he must venture forth,
when a blizzard roars out on the plains.
It's a land where the snow drifts
are sculptures in pearl,
when the cold is compelling and raw,
It's a land where the chinook
sweeps in with a swirl
and you bask in the warmth of a thaw.

It's a land for the big and the brave
and the strong,
it's a land for the ones who can dare.
It's a land of great promise
where good men belong,
who are willing to do their full share.
It's a land of good people
on whom you depend.
It's a land that's eternally free.
It's a land of great beauty
and peace without end...
it's the one land on earth for me.

Florence R. Renfrow

FANTASTIC, FABULOUS, FAR OUT FARM FACTS!
(Introduction bulletin board)

SUPPLIES: "Fantastic Farm Facts" ditto
construction paper
markers
tagboard

INTRODUCTION: Thanks to labor-saving equipment and advanced scientic technologies, farmers today are working fewer hours and producing more. Farmers produce enough food to feed the growing population of America as well as exporting large amounts to foreign neighbors.

PROCEDURE: Using the farm center shapes or any other farm related designs, place them on a bulletin board.

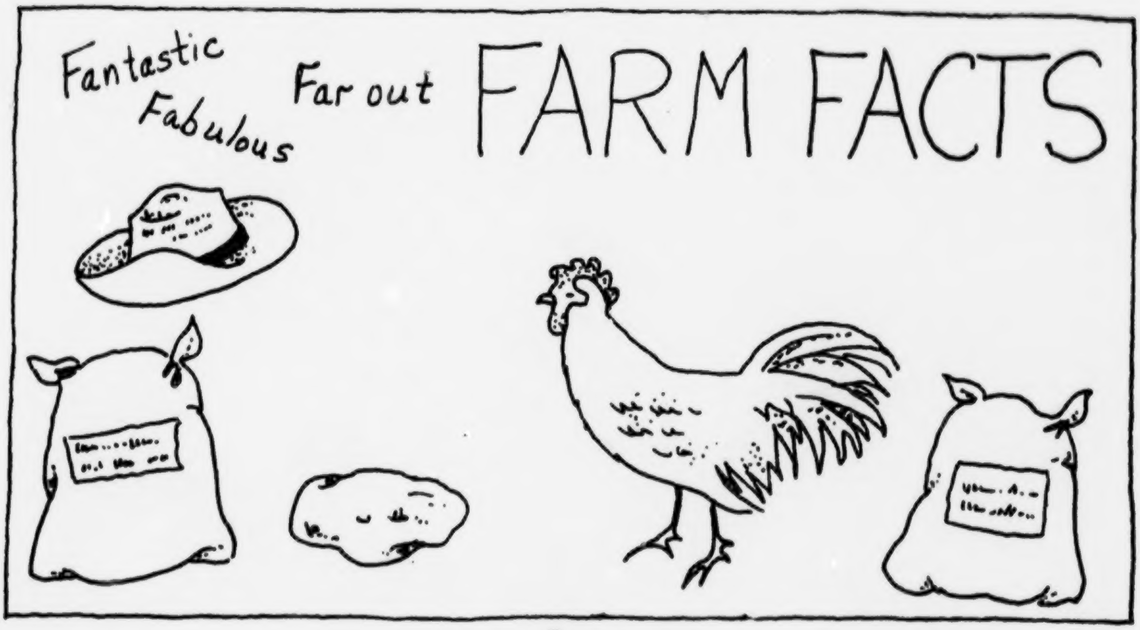
Mount all of the "far out" facts onto construction paper. (see ditto)

Place these facts at random around the farm.

Start off the day discussing these fabulous facts.

Encourage the students to contribute other facts as they research their agricultural projects.

ANOTHER IDEA: You might like to extend this activity into a "Fact of Falsehood" game. Have the students guess if a statement read by the teacher is a true fact about North Dakota farming or a falsehood.



FANTASTIC, FABULOUS, FAR OUT FARM FACTS!

ONE NORTH DAKOTA FARM FAMILY FEEDS 78 PEOPLE--52 IN THE UNITED STATES, 26 ABROAD!

ONE OUT OF EVERY TWO PEOPLE IN THE WORLD IS A FARMER!

ONE OUT OF EVERY TWENTY-FIVE PEOPLE IN THE UNITED STATES IS A FARMER!

ONE CHICKEN LAYS ABOUT 240 EGGS A YEAR!

A SINGLE BUSHEL OF WHEAT PRODUCES 66-1 POUND OR 44-1½ POUND LOAVES OF BREAD!

AN AVERAGE DAIRY COW PRODUCES ABOUT 62 GLASSES OF MILK EACH DAY!

A CALF BORN TODAY WILL BE READY FOR MARKET AS A BEEF ANIMAL IN ONE AND ONE-HALF YEARS!

NORTH DAKOTA RANKS HIGH IN THE PRODUCTION OF HONEY!

NORTH DAKOTA IS #1 IN DURUM AND HARD RED SPRING WHEAT AND 2nd IN OVERALL WHEAT PRODUCTION!

AMERICANS EAT OVER 11 BILLION POUNDS OF HAMBURGER MEAT A YEAR!

THE AVERAGE AMERICAN EATS 55 POUNDS OF HAMBURGER EVERY YEAR!

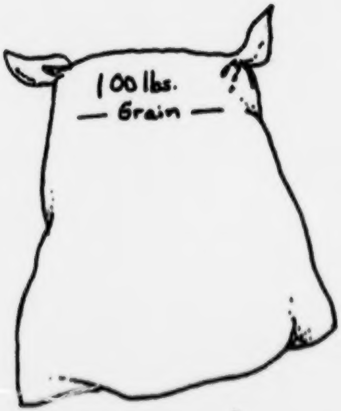
AN AVERAGE SIZE POTATO CONTAINS ONLY 90 CALORIES: ABOUT THE SAME AS AN APPLE!

EVERY SUNFLOWER IS REALLY HUNDREDS OF FLOWERS ATTACHED TO THE SAME STEM!

A SUNFLOWER CAN TOWER MORE THAN 15 FEET HIGH WITH A GIGANTIC FLOWER HEAD AS WIDE AS TWO FEET ACROSS!

BY THE YEAR 2000 THE WORLDS' FARMERS WILL HAVE SOME SIX BILLION MOUTHS TO FEED!

TODAYS FARMERS GROW CROPS ON THE SAME ACREAGE AS THEY DID IN 1910, BUT FEED MILLIONS MORE BECAUSE OF INCREASED PRODUCTIVITY FROM EVERY ACRE!


100 lbs.
— Grain —

SHADOWS DOWN ON THE FARM
(A shadow play)

SUPPLIES:
- construction paper
- sticks and straws
- brads for moveable parts
- tape recorder and tape
- old sheet
- overhead projector or lamp

INTRODUCTION: The sun provides a beautiful display on the farm, every day from sunrise to sunset. The shadows that it casts are fascinating and beautiful, also. What do you suppose the farm animals think of their own shadows? Their shadow follows them everywhere; they can't lose it, hide from it, or get rid of it!

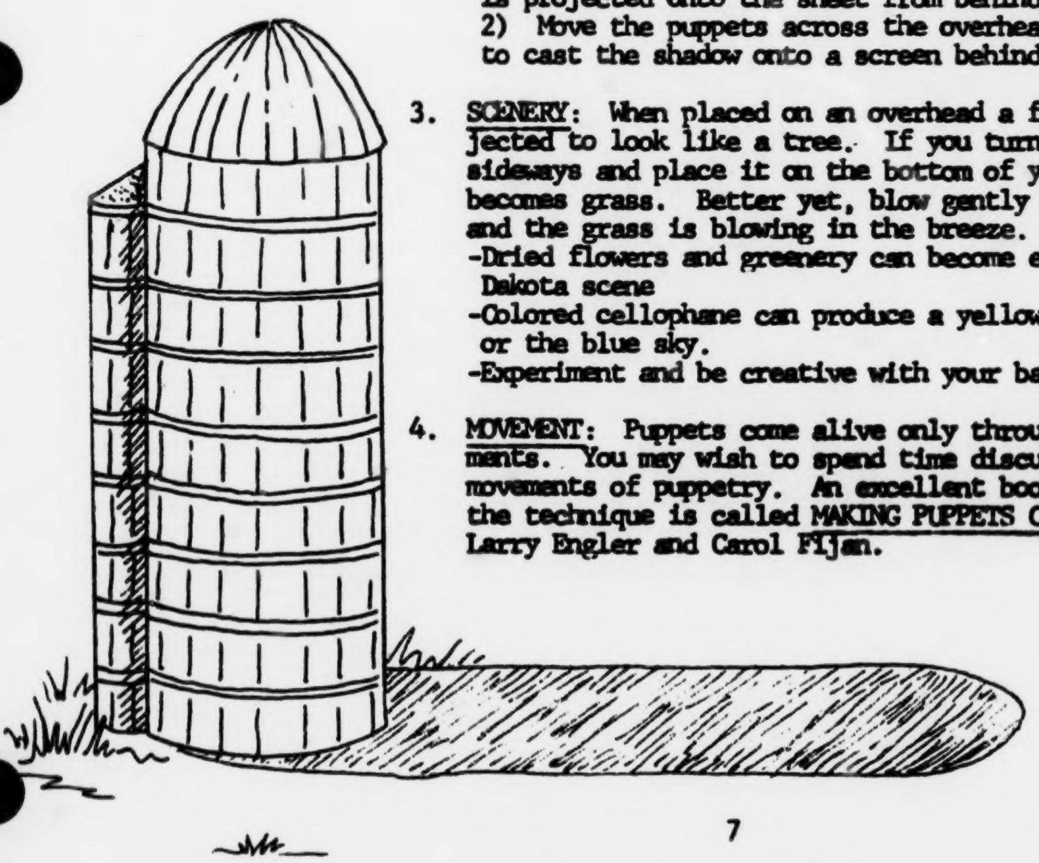
PROCEDURE:

1. PUPPETS: There are three kinds of shadow puppets your class could make.
   1) Silhouette puppet
   2) Silhouette puppet with cut out design
   3) Human shadow puppet (students are the puppets)

2. VIEWING SCREEN: Here are two ways which this puppet play could be projected.
   1) Hang an old sheet up between the audience and performers. A light in form of a lamp or overhead is projected onto the sheet from behind the scenes.
   2) Move the puppets across the overhead projector to cast the shadow onto a screen behind you.

3. SCENERY: When placed on an overhead a feather is projected to look like a tree. If you turn the feather sideways and place it on the bottom of your scene it becomes grass. Better yet, blow gently on the feather and the grass is blowing in the breeze.
   -Dried flowers and greenery can become entire North Dakota scene
   -Colored cellophane can produce a yellow burning sun, or the blue sky.
   -Experiment and be creative with your background.

4. MOVEMENT: Puppets come alive only through their movements. You may wish to spend time discussing the basic movements of puppetry. An excellent book illustrating the technique is called MAKING PUPPETS COME ALIVE by Larry Engler and Carol Fijan.



SHADOWS DOWN ON THE FARM continued

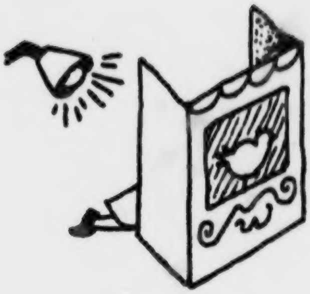
5. AUDIO: Each student should select an animal that is related to the farm and write their script any number of ways:
   - A) Use books with rythmic patterns such as, "Brown Bear, Brown Bear, What do you see?"
   - B) Write a riddle about the animal
   - C) Write a short poem
   - D) Limericks are fun poems to write as well as to hear. A limerick has five lines. Lines 1, 2, and 5 rhyme with each other and lines 3 and 4 rhyme.
   - E) Tape the children in the order of their appearance to make the production flow with ease. Add music to make the production even better.

ANOTHER IDEA:

1. Stimulate interest in shadows by brainstorming with the students shadow association. For example:

Shade
Sundial
Silhouette
Shadow Boxing
Eclipse

ME AND MY SHADOW (song)
5 o'clock shadow
THE WHITE SHADOW (TV program)
Shadow boxes
MOONSHADOWS (song)

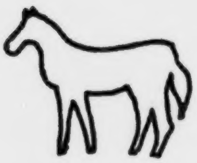


Make a bulletin board entitled, "Beyond a Shadow of a Doubt"

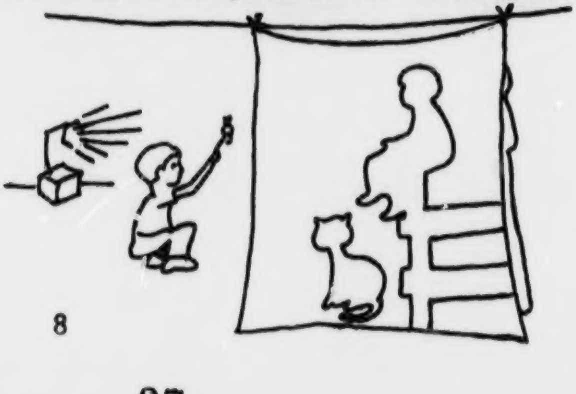
2. Research the history of shadow plays. Where did they originate and for what purpose were they?

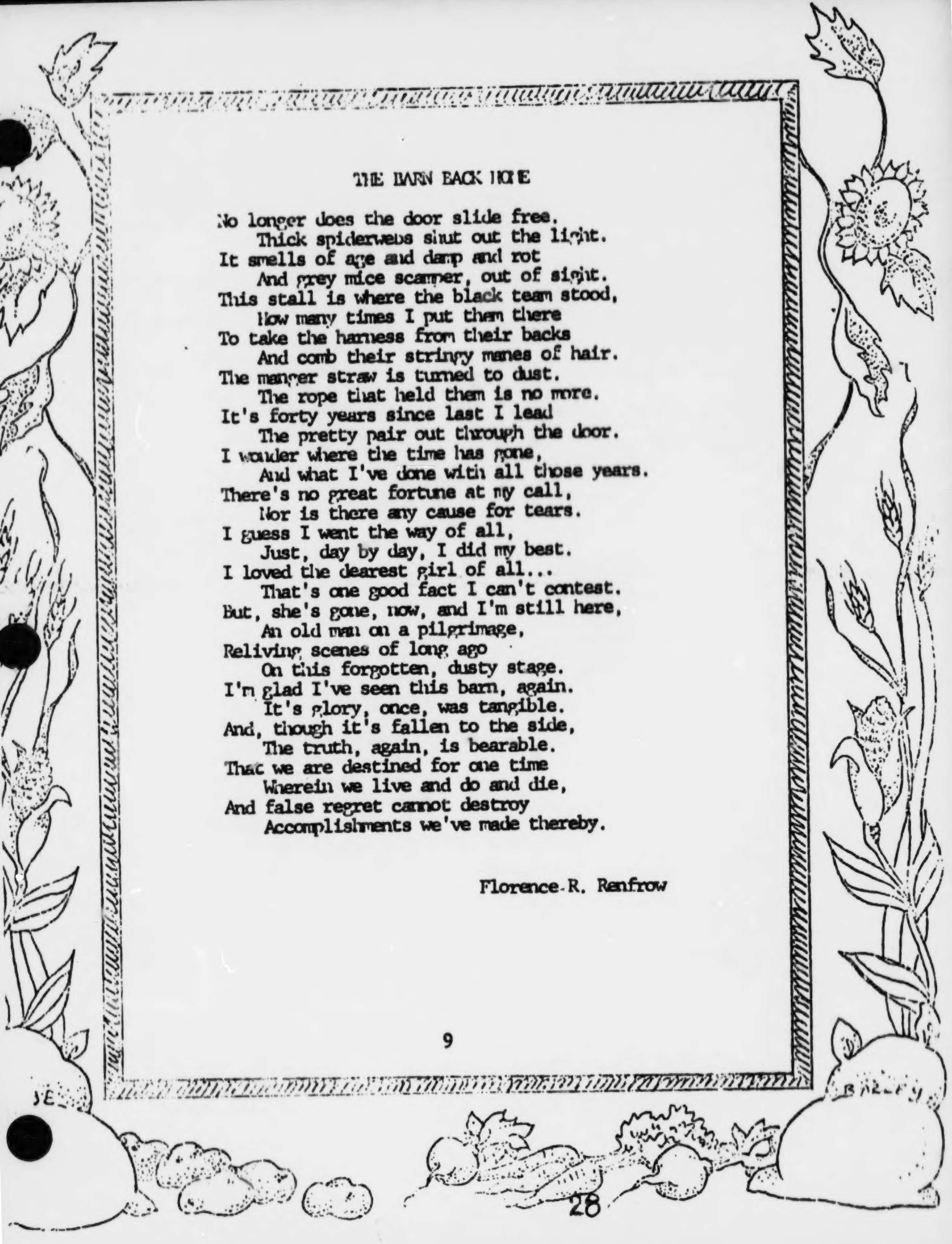
3. Find out what early puppets were made of.

4. Early man had many superstitions about his shadow. Research these myths. What tribes still believe in them today?



5. A shadow play theater can be constructed out of a large cardboard box. Cut out a window and cover it with white butcher paper. Decorate the front attractively and you are ready to go. Reports do not always have to be in written form. An individual student may wish to present a research report in the form of a shadow play. Thus the student not only researches but produces for an audience!



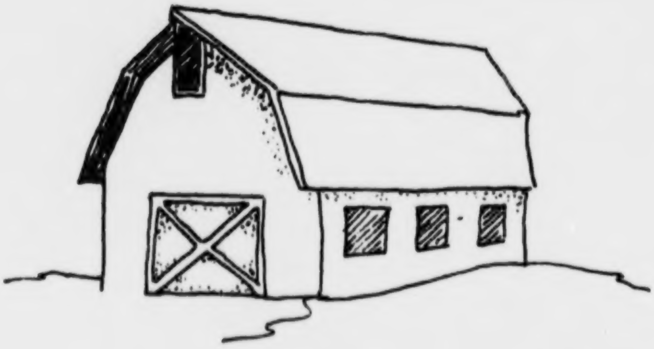


THE BARN BACK HOME

No longer does the door slide free.
Thick spiderwebs shut out the light.
It smells of age and damp and rot
And grey mice scamper, out of sight.
This stall is where the black team stood,
How many times I put them there
To take the harness from their backs
And comb their stringy manes of hair.
The manger straw is turned to dust.
The rope that held them is no more.
It's forty years since last I lead
The pretty pair out through the door.
I wonder where the time has gone,
And what I've done with all those years.
There's no great fortune at my call,
Nor is there any cause for tears.
I guess I went the way of all,
Just, day by day, I did my best.
I loved the dearest girl of all...
That's one good fact I can't contest.
But, she's gone, now, and I'm still here,
An old man on a pilgrimage,
Reliving scenes of long ago
On this forgotten, dusty stage.
I'm glad I've seen this barn, again.
It's glory, once, was tangible.
And, though it's fallen to the side,
The truth, again, is bearable.
That we are destined for one time
Wherein we live and do and die,
And false regret cannot destroy
Accomplishments we've made thereby.

Florence R. Renfrow

BATIK BARNS
(Art activity)

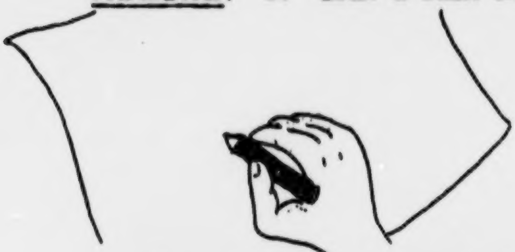


SUPPLIES: crayons
drawing paper
diluted tempera paint or water colors

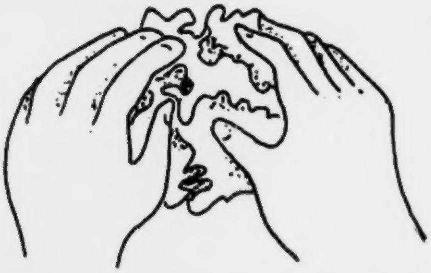
INTRODUCTION: The red barn was at one time a very familiar sight on farms all across the prairie.

Red was the standard color for barns. Merchants generally stocked only red paint. The reason for this narrow selection of color was a simple one. Red paint was made from red soil or clay and mixed with linseed oil, which was extracted from flax seed. These materials were cheap and readily available.

PROCEDURE: 1. Draw a barn on the paper. A fence, silo, or other details may be included.



2. Press heavily and color in all areas. Bright colors will give the best results.

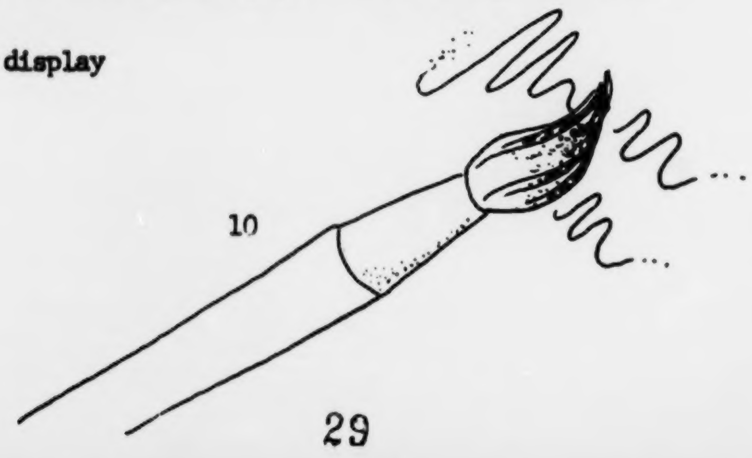


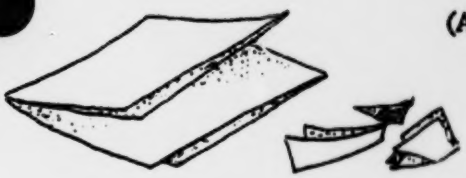
3. Where coloring is completed, place the paper under cold running water and carefully crumple into a ball. Open slowly and repeat.

4. Lay the wet paper on newspaper, flatten and paint over the entire area using the water color or diluted tempera. (Brown or black give best results.) Blot off excess paint with a paper towel.

5. Let dry, then iron between paper towels using a warm iron.

6. Mount and display





PAPER MOONS
(Art activity)

SUPPLIES:
- black construction paper
- colored construction paper for mounting
- scrap paper
- small sharp scissors such as fingernail scissors or dissecting scissors

INTRODUCTION: Symbolism is worldwide and has been with us throughout history. Symbols are woven into our lives in many ways. Think of all the symbols you can identify--the list is endless. Roadside symbols, advertising symbols, state and country symbols, and good luck symbols are just a few.

Farmers, in the earliest times up to the present, have brought symbolism to the farm in a variety of ways. One beautiful way was through paper cutting.

In Mexico, early farmers cut symbols of good and evil spirits out of layers of colored paper. Each colored paper represented a crop. The symbols were sewn together and placed in the fields to assure abundant crops.

The sheep shears of the Polish sheep farmer was a busy tool. By day, it was used to shear sheep, an art in itself. By night, the women would use the same shears to cut from paper intricate designs and symbols. These colorful decorations were glued to the wall along the edge of the ceiling, put on ceiling beams, backs of chairs, or on chests and cupboards.

PROCEDURE: 1. Fill the chalkboard with the students' symbol ideas related to agriculture. Some paper moon symbol ideas might be drawn from such things as:

CROPS
MACHINERY
LIVESTOCK
FARMER
FOOD PRODUCTS
WILD ANIMALS THAT LIVE IN THE COUNTRY
HARVEST TIME
PLANTING TIME
BARNS
RANCHER
ANIMAL PRODUCTS
SUN
SEASONS
WEATHER
WATER

2. The art project is constructed the same way symmetrical snowflakes are designed and cut. The student may wish to practice drawing and cutting a simple symbol on scrap paper before doing the finished project.

PAPER MOONS continued
Procedure #2 continued

DIRECTIONS:

A. Fold black construction paper once, twice for more detail.

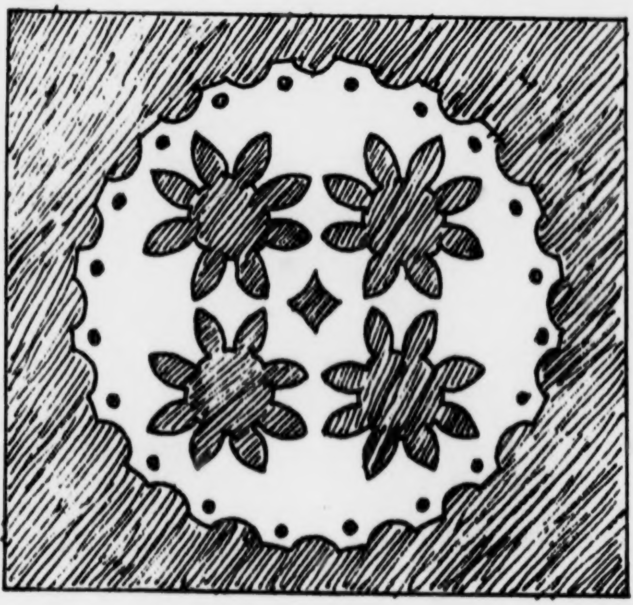
B. Draw symbol on the folded piece

-encourage simple symbol with a touch of detail
-include a creative square or circular border
-EVERY PART OF THE DRAWING MUST CONNECT TO EACH OTHER
-Symbols and border must join in some places, otherwise the drawing will fall apart when cut.

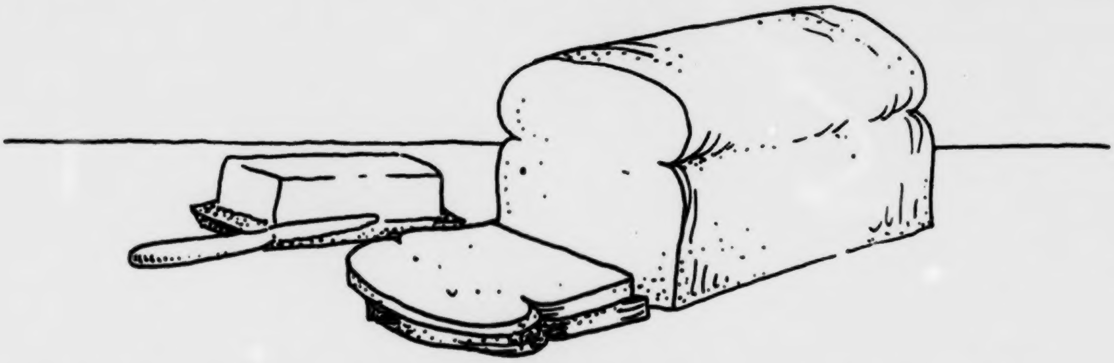
C. Use scissors to cut away the negative space.
D. Mount the paper moon onto colored construction paper and decorate your classroom just as the Polish women did their homes.

ANOTHER IDEA:

--Write poems to go with the symbol related to agriculture.
--Make up original good luck symbols for farming through paper moons. Write a narrative explaining the meaning of the symbol.



FARMING IS EVERYBODY'S BREAD AND BUTTER



This is a popular bumper sticker often seen on many farmers' vehicles. It carries a weight of meaning. We all need the farmer in order to survive!

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "Farming is Everybody's Bread and Butter."
2. You may not use proper nouns such as TOM.
3. Plurals are allowed.
4. Each letter may be used only once. For example: MATTER is okay but TOFFEE is not because of the two f's.

*There are over 750 words! How many can you find?

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
10. ____________________
11. ____________________
12. ____________________
13. ____________________
14. ____________________
15. ____________________
16. ____________________
17. ____________________
18. ____________________
19. ____________________
20. ____________________
21. ____________________
22. ____________________
23. ____________________
24. ____________________
25. ____________________
26. ____________________
27. ____________________

SUGGESTED ANSWERS FOR "FARMING IS EVERYBODYS BREAD AND BUTTER" WORD HUNT

adorn
afar
age(s)
aged
agree(s)
agreed
aid(s)
aided
aiding
aim(s)
aimed
aiming
air(s)
aired
airy
any
arbitrary
are
argue(s)
argued
arguing
arm(s)
armed
army
art(s)
ate
atom

bad
badge(s)
bag(s)
bait
baited
baiting
ban(s)
band(s)
bang(s)
bar(s)
barred
barb(s)
barbed
bard(s)
bare
bargain(s)
barge(s)
barged
barn(s)
barren
barrette(s)
base(s)
based
baste
basting
bat(s)
bead(s)
bean(s)
bear(s)
beard(s)
beast
beat(s)
beaten
beating
bed(s)
bedding
beef
been
beer(s)
beet(s)
befriend
began
begin
begun
bend(s)
bending
bent
berate
berm
berry
best
bet(s)
better
betting
bid
bier
boar(s)
board(s)
boarding
boarder
boast
body
bodies
bomb(s)
bombing
bond(s)
bonding
bone(s)
boned
border(s)
bordering
bore(s)
bored
boring
born
bovine(s)
bow(s)
bowed
bowing
braid(s)
braiding
brand(s)
branding
brass
brat(s)
brave(s)
bravery
bravo
bray(s)
braying
briar(s)
bride(s)
bridge(s)
bridged
brief
brim
brine
bring
broad(s)
broaden
brow(s)
brown
bruin(s)
brunt
budge(s)
budged
bun(s)
burn(s)
burned
burning
bus(es)
bussing
but
butte(s)

dad(s)
daddy
dairy
dare(s)
darn(s)
darned
darning
dart(s)
darted
darting
date(s)
dated
dating
dead
deaden(s)
deadened
deaf
deafen
dear
debit
debrief
debt(s)
debted
debtor
deer
den(s)
dent(s)
dented
deride
derive
did
dirt
dirty
dirtier
dirtiest
divine
doe
doer
does
done
donut(s)
dot(s)
dotted
drain(s)
drained
draining
dread(s)
dreading
dream(s)
dreamed
dreaming
dreamy
dredge
dredged
dredging
dress
dressed
dressy
drone(s)
drown(s)
dry(s)
dried
drying
dubbed
dumb
dune(s)
dust
dusted
dustier
dustiest
dusty
duties
duty
eager
eagerness
ear(s)
earn(s)
earned
earning
east
eastern
eat
eaten
ebb(s)
ebony
edit(s)
edited
editing
editor
eerie
emissary
emit(s)
emitted
endeavor
engrave
ermine
even
eventide
ever
every
everyone
eye(s)

fair(s)
fairy
fame
famine
fan(s)
far
farm(s)
fatigue
favor(s)
favored
favoring
fear(s)
feared
fearing
feat(s)
fed
feed(s)
feet
feminine
ferry
fever
first
fist
for
fort(s)
fortune(s)
frame(s)
free(s)
freed
fret(s)
fretting
fried
fries
from
fry

gas(es)
gave
gaze(s)
gazed
get(s)
gift(s)
gifted
gin
gist
give(s)
given
god
got
gut(s)
gutted
grab(s)
grabbed
grabby
grade(s)
graded
grand
grandeur
grandiose
grass
grant(s)
grate(s)
grated
grave(s)
gray
great
greed
greedy
grew
grey
grid(s)
grief
grieve(s)
grim
grin(s)
grinned
grit(s)
gritted

SUGGESTED ANSWERS FOR 'FARMING IS EVERYBODYS BREAD AND BUTTER" WORD HUNT
continued. . .

gritty
gross
grove(s)
grow(s)
grown
grub(s)
gruel

ibid
idea(s)
idiom(s)
idiot(s)
indent
innate
inn(s)
integer
intern(s)
interred
into
iodine
irate
ire
iron(s)
ironed
ironing
irony
irrigate
irritate

made
maid(s)
maiden
mar(s)
marred
married
marries
marry
meander(s)
meandered
mere
mermaid(s)
merry
mess
message
messy
met
mint(s)
minted
mire(s)
mired
mirror(s)
mist
mister
misty
miter
modern

more
most
mud

nay
near
nearing
nearby
neat
neater
need(s)
needy
net(s)
netting
netted
never
nod(s)
non
none
nor
not
nun
nut(s)
nutty

oar(s)
often
omen(s)
one
orange(s)
ore
organ(s)
organist
otter(s)
oven(s)
over
overt
overture
owe(s)
owed
own(s)
owned
owner
owning

rabid
raft
rag(s)
raid(s)
raise(s)
raised
raising
raisin
ram(s)
ran
random

rant
rare
rate(s)
rave(s)
raw
read(s)
reading
ready
reason
red
remind
rent(s)
rented
renter
renting
rerun
retrieve
return
rest(s)
rested
resting
ribbed
rib(s)
ribbing
rig(s)
rigid
rigor
ring(s)
rise(s)
risen
rising
roast(s)
roasted
roaster
roasting
roster(s)
rot(s)
rotted
rotten
rotting
rub(s)
rubbed
rubber
rubbing
ruddy
rug(s)
run(s)
rut(s)
rutted

sad
sadden
sadder
saddest
sag(s)
sage

sand
sander
sandy
sat
satiate(s)
saturate(s)
saw
sea(s)
seam(s)
sear(s)
seared
searing
seat(s)
seated
seating
see
seed(s)
seedy
seem(s)
seen
set
settee
setter
sever(s)
severe
sew(s)
sewer
side(s)
sieve
sift
sifted
sifting
sin(s)
sinned
sinning
sinner
sing(s)
singer
sister
song(s)
soar(s)
soared
soaring
sob(s)
sobbed
sobbing
sod
soddy
son(s)
sore(s)
sow(s)
sown
sub(s)
subbing
submarine(s)
sudden

sugar
sun
sunny
sure
swam
swan(s)
swear(s)
sweat(s)
sweater(s)
sweet(s)
sweeten
sweeter
sweetest
swim(s)
swine
sword(s)
swore
sworn

tag(s)
tan(s)
tanned
tar
tarred
tarries
tarried
tarry
taste
tasted
tasting
team(s)
tear(s)
ten
tenor
tent(s)
tenting
tenure
term(s)
termite(s)
tern
terry
test(s)
tested
testing
timid
tire(s)
tired
toast
tom
tomb(s)
ton(s)
tore
torn
tot
tow
tread(s)

treat(s)
treated
trend(s)
tried
tries
try
tub(s)
tube(s)
tubby
tuber
turn
turning
tweet
twin(s)

under
understand(s)
understanding
undone
until
unto
urge(s)
urged
urging
urgent
use
using
utter(s)
uttering

van(s)
varied
varies
various
varment
vary
vat(s)
venture
very
vigor

yard(s)
yarn(s)
year(s)
yes
yet

A NEW LICENSE FOR OUR STATE

SUPPLIES: Ditto of North Dakota license plate

INTRODUCTION: North Dakota is the most agricultural state in the nation but our license plate boasts that we are the Peace Garden state. We should be proud of our agricultural ranking. What if we could change our license plate to symbolize this fact? What better way to show it than to visually display it on the license plates of our cars!

PROCEDURE:

1. Have the students brainstorm as many reasons they can think of that rank North Dakota Number 1 as an agricultural state. List the crops and animals grown or raised in North Dakota.
2. Each child could select one of the topics that the class came up with or choose an original idea that was not listed.
3. As further stimulation you may wish to study the plates of other states in order to critique which ones are attractive and why.
4. Illustrate your chosen topic and write your new motto on the license plate ditto provided.
5. The teacher may wish to emphasize these points when the child is ready to illustrate their own license plate.
   - A) simple design
   - B) large lettering
   - C) eye-catching colors
   - D) utilizing the space wisely

ANOTHER IDEA: For the students who really found this project enjoyable they may wish to do the following activities.

1. Research some or all of the other 49 states. Find out the number one agricultural product grown in each state.
2. Write a new motto and illustrate the Number 1 agricultural product of one or more of these states.

THE FARMER: A PERFECT "10"
(Language art lesson)

SUPPLIES:

chalkboard
pencils
paper

INTRODUCTION:

Many people have helped to make North Dakota number one as an agricultural state. First and foremost on that list is the farmer. The flavor of life on the North Dakota farm remains essentially the same as in the past. What common characteristics link the past, present, and future farmers of North Dakota together?

PROCEDURE:

1. Brainstorm as many words as the class can think of that would be important characteristics to a North Dakota farmer.

2. Individually have the students evaluate and list the ten most important characteristics a North Dakota farmer must possess.

3. Allow time for students to share their 10 characteristics. (This includes time for students to discuss and defend their choices).

4. Then, as a class, come to a consensus about the 10 characteristics most needed by a farmer.

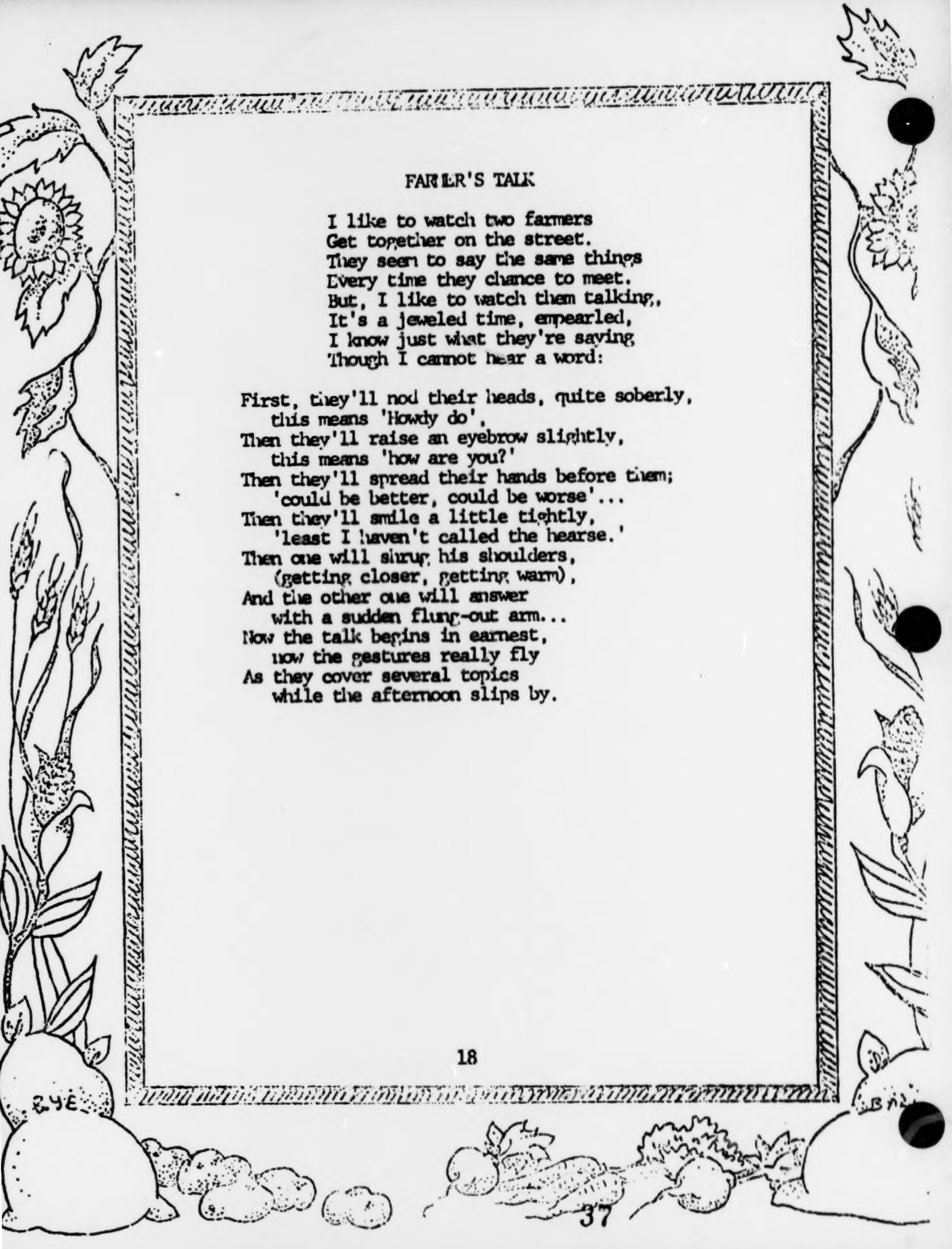
5. Create a bulletin board showing the results of the class project.

ANOTHER IDEA:

1. Using all the characteristics the students originally brainstormed, you might try a synonym-antonym word search. For example:

SYNONYM	ORIGINAL WORD	ANTONYM
brave	courageous	cowardly
friendly	cordial	cold
hearty	healthy	sickly

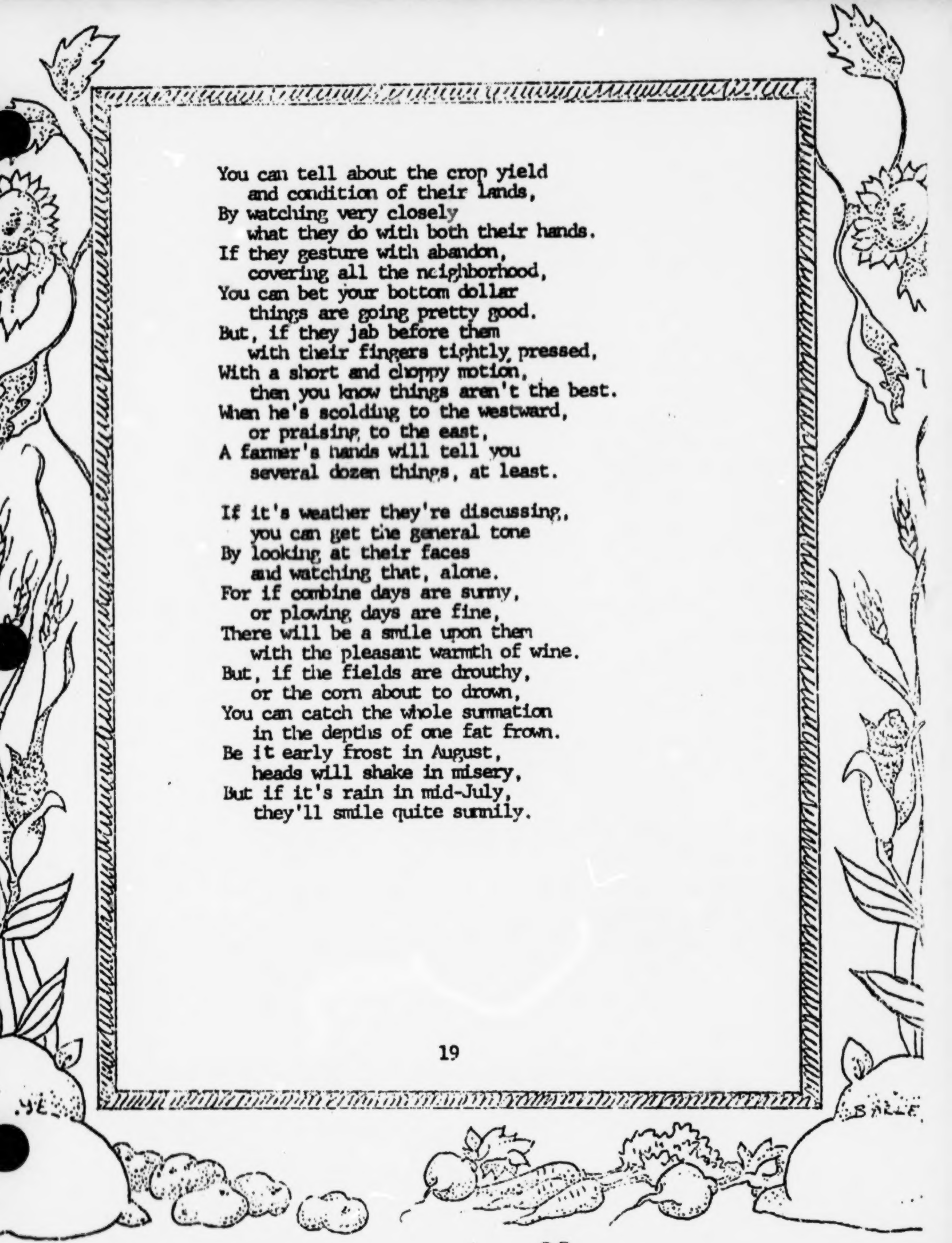
2. This compiled list of words could be saved and used for other writing experiences.



FARMER'S TALK

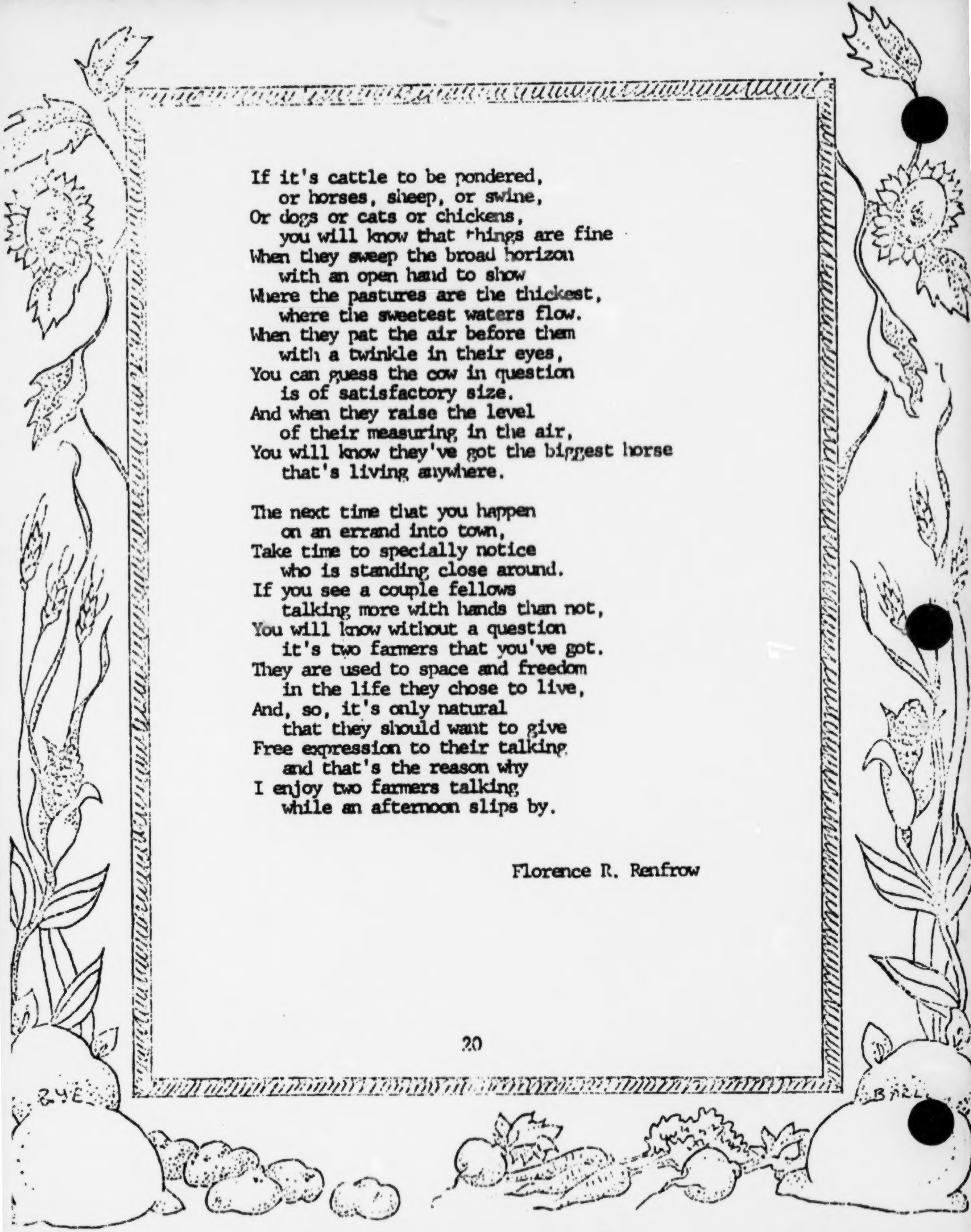
I like to watch two farmers
Get together on the street.
They seem to say the same things
Every time they chance to meet.
But, I like to watch them talking,
It's a jeweled time, empearled,
I know just what they're saying
Though I cannot hear a word:

First, they'll nod their heads, quite soberly,
   this means 'Howdy do',
Then they'll raise an eyebrow slightly,
   this means 'how are you?'
Then they'll spread their hands before them;
   'could be better, could be worse'...
Then they'll smile a little tightly,
   'least I haven't called the hearse.'
Then one will shrug his shoulders,
   (getting closer, getting warm),
And the other one will answer
   with a sudden flung-out arm...
Now the talk begins in earnest,
   now the gestures really fly
As they cover several topics
   while the afternoon slips by.



You can tell about the crop yield
and condition of their lands,
By watching very closely
what they do with both their hands.
If they gesture with abandon,
covering all the neighborhood,
You can bet your bottom dollar
things are going pretty good.
But, if they jab before them
with their fingers tightly pressed,
With a short and choppy motion,
then you know things aren't the best.
When he's scolding to the westward,
or praising to the east,
A farmer's hands will tell you
several dozen things, at least.

If it's weather they're discussing,
you can get the general tone
By looking at their faces
and watching that, alone.
For if combine days are sunny,
or plowing days are fine,
There will be a smile upon them
with the pleasant warmth of wine.
But, if the fields are drouthy,
or the corn about to drown,
You can catch the whole summation
in the depths of one fat frown.
Be it early frost in August,
heads will shake in misery,
But if it's rain in mid-July,
they'll smile quite sunnily.



If it's cattle to be pondered,
   or horses, sheep, or swine,
Or dogs or cats or chickens,
   you will know that things are fine
When they sweep the broad horizon
   with an open hand to show
Where the pastures are the thickest,
   where the sweetest waters flow.
When they pat the air before them
   with a twinkle in their eyes,
You can guess the cow in question
   is of satisfactory size.
And when they raise the level
   of their measuring in the air,
You will know they've got the biggest horse
   that's living anywhere.

The next time that you happen
   on an errand into town,
Take time to specially notice
   who is standing close around.
If you see a couple fellows
   talking more with hands than not,
You will know without a question
   it's two farmers that you've got.
They are used to space and freedom
   in the life they chose to live,
And, so, it's only natural
   that they should want to give
Free expression to their talking
   and that's the reason why
I enjoy two farmers talking
   while an afternoon slips by.

Florence R. Renfrow

PAPER DOLL FARMER
(Art project)

SUPPLIES:

- paper doll pattern
- cardboard
- encyclopedias
- reference books
- biographies
- cloth scraps
- wallpaper books
- chalk
- paint
- exacto knives

INTRODUCTION: A farmer's job description has become more varied as the farm has taken on an air of sophistication and complexity.

PROCEDURE:

1. Brainstorm the many roles of a farmer today. Some examples--

   producer
   mechanic
   student
   gambler
   carpenter
   agronomist
   veterinarian
   business manager
   meteorologist
   conservationist
   botanist
   seller/buyer
   farmer
   rancher
   beekeeper
   dairy farmer
   computer programmer
   sheep harder

2. Have the students select a farming role they would like to make into a paper doll.

3. Research facts and dress the paper doll with authentic articles true to the particular role he/she has selected.

4. Now use the paper doll pattern (blown up to the size you desire) trace on and cut out a cardboard doll for each student.

5. Clothing pattern steps-

   -Trace the cardboard body onto butcher paper.
   -Now design the costume on the butcher paper.
   -Cut out the pattern pieces from the butcher paper.
   -Lay the pattern pieces on the desired pieces of fabric or wallpaper and cut out.
   -Glue the costume to the paper doll. (Remind the student to glue in the same order one would dress.)
   -Encourage the students to be elaborate with their costume. For example: tools, instruments, and other equipment.

6. Now place your finished farmers on a bulletin board or on a mural for all to see!

ANOTHER IDEA:

You may wish to invite a farmer into the classroom to discuss his various roles.

OR

Use this format to research the many occupations that are directly related to farming.

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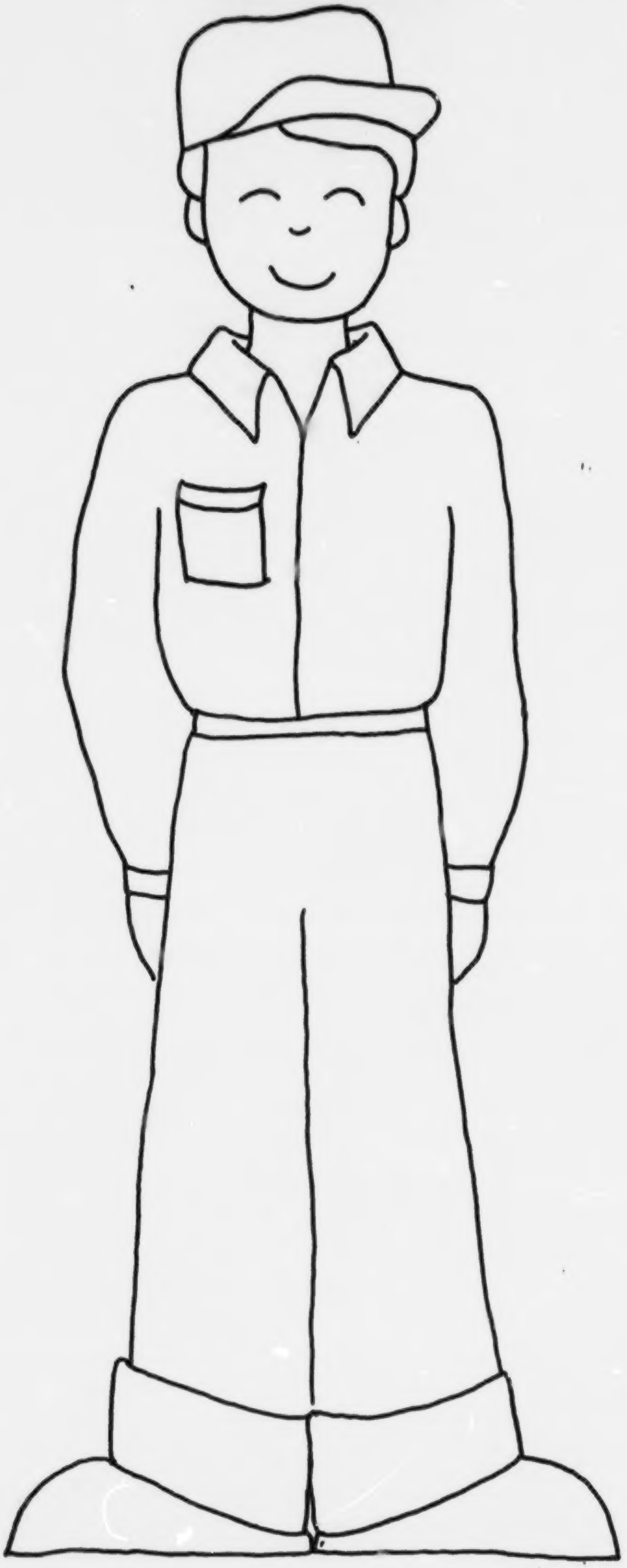
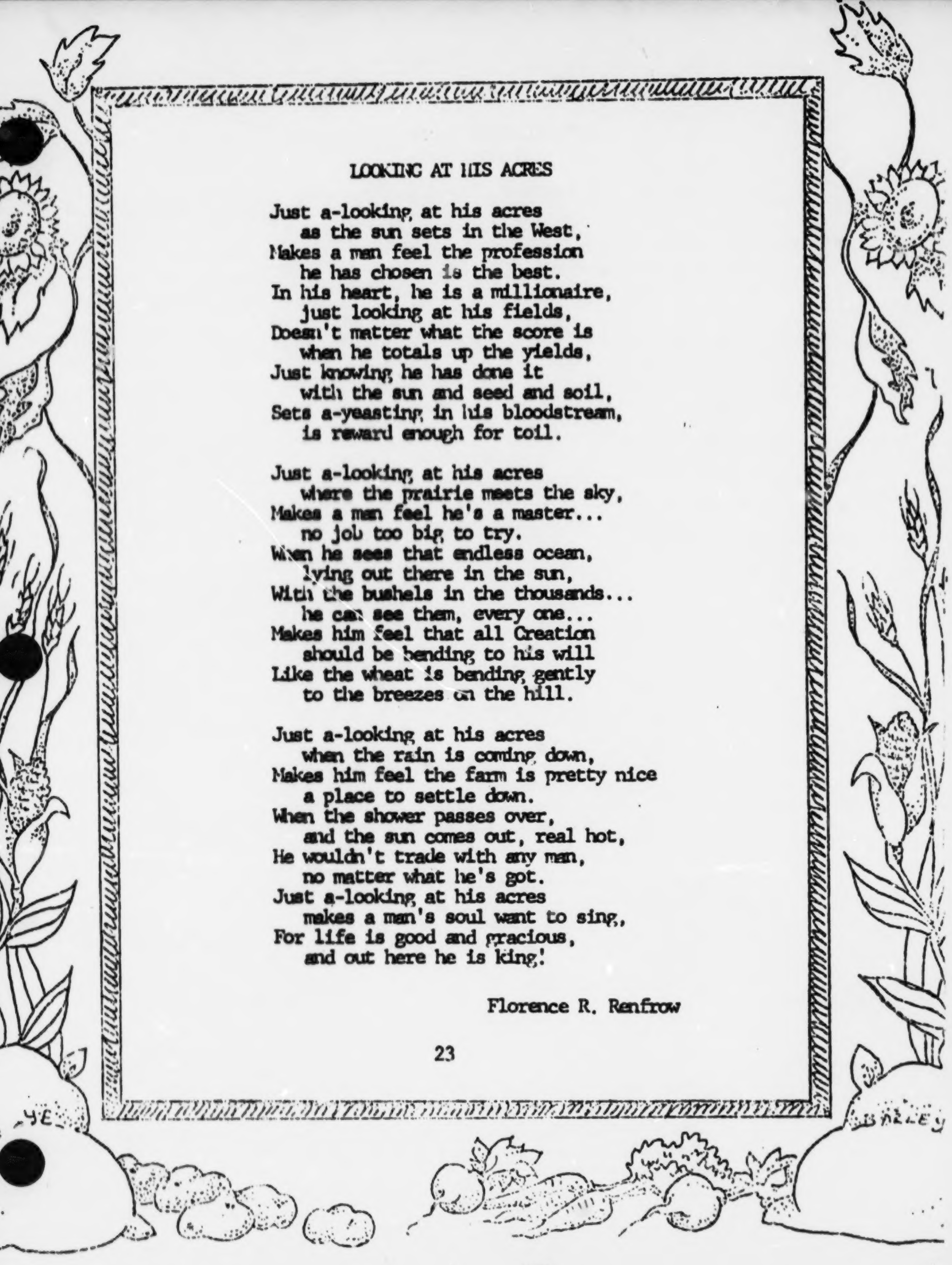
PAPER DOLL PATTERN





LOOKING AT HIS ACRES

Just a-looking at his acres
as the sun sets in the West,
Makes a man feel the profession
he has chosen is the best.
In his heart, he is a millionaire,
just looking at his fields,
Doesn't matter what the score is
when he totals up the yields,
Just knowing he has done it
with the sun and seed and soil,
Sets a-yeasting in his bloodstream,
is reward enough for toil.

Just a-looking at his acres
where the prairie meets the sky,
Makes a man feel he's a master...
no job too big to try.
When he sees that endless ocean,
lying out there in the sun,
With the bushels in the thousands...
he can see them, every one...
Makes him feel that all Creation
should be bending to his will
Like the wheat is bending gently
to the breezes on the hill.

Just a-looking at his acres
when the rain is coming down,
Makes him feel the farm is pretty nice
a place to settle down.
When the shower passes over,
and the sun comes out, real hot,
He wouldn't trade with any man,
no matter what he's got.
Just a-looking at his acres
makes a man's soul want to sing,
For life is good and gracious,
and out here he is king!

Florence R. Renfrow

SOFT SCULPTURE CHARACTERS
(Art activity)

"The farmers are the founders of civilization and prosperity."
Daniel Webster

SUPPLIES: old discarded panty hose
needle and thread
cotton batting
buttons
beads
fabric scraps
yarn
leather scraps
other odds and ends

INTRODUCTION: Why not create your own farmer, or better yet create your own entire farming family? Creating your own soft sculpture may give you a feeling of how the pioneer mothers felt while stitching their own children's rag dolls.

PROCEDURE:

1. Cut off the top section and the foot of the pantyhose.
2. Knot it at the ankle. Using cotton batting, stuff to form the head. Knot at the top. Press the head back through the remaining stocking and knot at the bottom. Be sure to stuff tightly.
3. Begin facial features using a needle and thread. Push the needle from the back of the head through to the front to begin the nose. Stitch from one side of the nose to the other to form the nose. The stitches should go under the batting and then be pulled tight.
4. Complete eyebrows, eyes and lips in the same manner.
5. Now create a character. Add unique touches such as hair, hats, mustaches and eyeglasses. Use scrap material such as bandannas, jeans or plaids.
6. Be creative! Steel wool makes great hair. Old jewelry adds a nice touch too.
7. The finished faces may be displayed as they are or stuffed bodies may be added.

ANOTHER IDEA: Read the article, "Oh, You Beautiful Doll," in Newsweek, September 7, 1981.
--Would you pay $1,000 for a stuffed doll?
--Why do you think people do?

Read National Geographic World's "Stitch 'n' Stuff Sculpture," September 1980.
--Would you like one of these dolls?
--Who would you like your doll to look like?
--How much would you pay for one?

INTERVIEWS FROM THE FIELD
(Case and field research activity)

SUPPLIES: "Interviews from the Field" ditto
tape recorder

INTRODUCTION: It has been said there are four ways for one to become a farmer--

1. Be born in a farming family,
2. Enter an agricultural program in high school or college,
3. Work as a farm hand and learn as you go, or
4. Marry a farmer's daughter!

Why not have your class interview several farmers to find out how and why they are farmers. While you are there, why not "harvest" several other facts about farmers.

PROCEDURE: 1. Use the interview sheet provided or have the class make up their own set of questions.

2. Discuss the elements of a good interview.

3. If possible try to use a tape recorder to save time during the interview. Later the information can be transferred to the interview sheet.

4. a) Select a farmer in your community to interview
   b) Contact the person and state the purpose of the interview (to survey a number of farmers) to find out more about farming in their own area.
   c) Set up a date, time and place for the interview.
   d) BE ON TIME!!
   e) Know your questions.
   f) Use good eye contact, speak up clearly and be courteous.
   g) Thank the person properly at the end of the interview.
   h) Write a thank you letter and mail it to the farmer you interviewed.

5. After completing all the interviews, chart the class results in various ways--graphs, percentages, etc. Many conclusions could be drawn from the information gathered as to the type of farming and farmers that are in your area.

ANOTHER IDEA: Have your students print a newspaper entitled, "Grassroots Report." Feature the farmers and the data gathered on their interviews.

Adapt the interview to fit cowboys and ranchers!

INTERVIEWS FROM THE FIELD

INTERVIEWER'S NAME ______________________________

FARMER'S NAME ______________________________

ADDRESS ______________________________

TYPE OF FARMER ______________ ______________

1. What made you choose farming?

____

____

____

____

2. What special training have you had for this job?

____

____

____

____

3. How long have you been farming?

____

4. How large is your farm?

____

5. What are three important duties of your job?

____

____

____

6. Do you wear any special uniforms? Why or why not?

____

____

7. What special tools or equipment do you use?

____

____

____

____

8. What do you like most about farming?

____

____

____

9. What one thing would you change about farming? Why?

____

____

____

10. Describe a typical day on your farm.

____

____

____

____

____

11. What is the funniest experience you have had on the farm?

____

____

____

____

12. What is the most unusual or dangerous job you have to do on the farm?

____

____

____

____

13. What changes do you see in the future for farming?

____

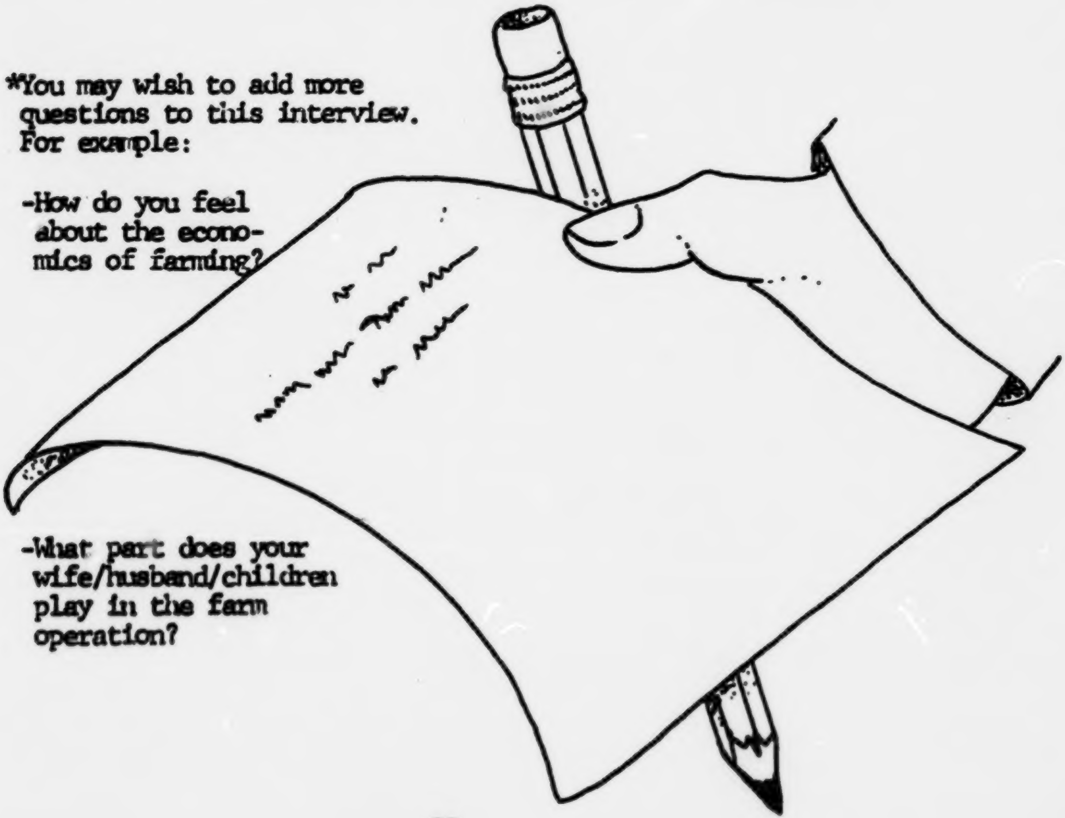
____

____

____

____

____



*You may wish to add more questions to this interview. For example:

-How do you feel about the economics of farming?

-What part does your wife/husband/children play in the farm operation?

SUPPLIES: Ballot and list of North Dakota Hall of Farm Fame Nominees

INTRODUCTION: Many people of the past and present have contributed to the development of North Dakota's fame in farming. The accomplishments have been as varied as the personalities. The contributions cannot be weighed by success alone, for success sometimes comes through failure.

PROCEDURE:

1. Pass out the information sheets containing the data about the nominees for the North Dakota Hall of Farm Fame.
2. As a class, read over the directions and all the information about the nominees.
3. Have the students individually rate five nominees from 1-5 with five points being given to the top choice and one point to the last choice on the ballot provided.
4. Tabulate class votes.
5. Name the top five for the North Dakota Hall of Farm Fame.
6. Names voted on but not in the top five could be given "Honorable Mention."

ANOTHER IDEA:

- -Create soft sculptures of all the nominees (see Soft Sculpture Characters)
- -Create marionettes of the top five and write a play about their life stories
- -Create a bulletin board called "The North Dakota Hall of Farm Fame" and display your top five winners.
- -Write up a short biography of each man to be used in The Grass Roots Report (see Interviews from the Field activity)
- -Add other important names and facts that you feel deserve to be in the North Dakota Hall of Farm Fame.
  For example: Governor Olson led a delegation to China;
  Milton R. Young dubbed "Mr. Wheat", etc.

ND HALL OF FARM FAME NOMINEES

1) Evaluate the following people and their contributions to the development of agriculture in North Dakota.

2) Choose five nominees to be placed in the North Dakota Hall of Farm Fame. List your five choices in order on the ballot below. The top choice will receive five points and the last choice one point.

THINKTHINKTHINKTHINKTHINKTHINKT

Evaluation means you must judge these people according to their contributions to North Dakota agriculture.

- -What is success or failure?
- -What long-term accomplishments did each person inspire?
- -What if this person had not contributed to our state?
- -Justify your choices

THINKTHINKTHINKTHINKTHINKTHINK!

NORTH DAKOTA HALL OF FARM FAME BALLOT

	NAME	POINTS
1.		5
2.		4
3.		3
4.		2
5.		1

NORTH DAKOTA HALL OF FARM FAME NOMINEES

ARIKARA, HIDATSA, MANDAN INDIANS

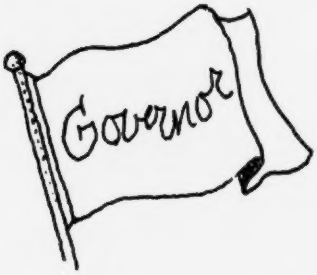
- native Indian tribes
- first farmers of North Dakota
- used crude tools such as digging sticks and buffalo shoulder bones
- planted and harvested corn, squash, sunflower and beans
- farmed along the banks and valleys of the Knife, Heart and Missouri Rivers
- built earth lodges

H.L. BOLLEY

- studied diseases of crops
- worked to get pure seed supplies
- helped start the North Dakota Experiment Station in 1890
- in 1910 he said North Dakota's soil was "wheat sick"
- farmers didn't want to believe him and he almost lost his job

JOHN BURKE

- a friend of the common man
- son of Irish immigrants
- came to North Dakota at age 29
- was a lawyer
- nicknamed "Honest John"
- known as North Dakota's Lincoln
- helped the farmer control his own destiny
- elected as a Democratic governor three times
- later served as Treasurer of the United States

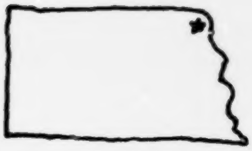


OLIVER DALRYMPLE

- manager of a bonanza farm
- 40,000 acre farm at Casselton, ND
- employed 400 men at harvest time
- his farm was a "model" to other bonanza farms

NORTH DAKOTA HALL OF FARM FAME NOMINEES continued

THOMAS DOUGLAS



- Earl of Selkirk in southwestern Scotland
- helped finance a group of colonists to settle in the area of what is now Pembina, ND
- the new colonists endured many hardships
- Selkirk visited the colony in 1816 after several colonists were killed by Indians
- the Earl was a dreamer
- he gave his fortune and health to help those less fortunate

ALEXANDER HENRY

- Red River fur trader
- kept a complete journal of his activities
- first white man to grow vegetable crops in ND
- operated a very successful small farm

JAMES HILL

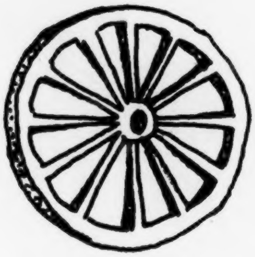
- known as "The Empire Builder"
- responsible for bringing the Great Northern Railroad to our state
- interested in carrying a large volume of freight at low cost
- interested in settling North Dakota
- efficient far-sighted railroad manager
- a friend to the farmer

EDWIN F. LADD

- a chemist
- studied sugar beets as a future ND crop
- researched evidence that food sold in ND was canned with harmful preservatives and dyes
- 1897 to 1911 wrote a series of laws to help insure that ND people were getting quality food
- helped start the ND Experiment Station in 1890

NORTH DAKOTA HALL OF FARM FAME NOMINEES continued

THE METIS PEOPLE



- people of both Indian and French parents
- farmed small plots along the Red River valley
- grew Indian corn, barley, oats, potatoes, wheat, tobacco, and garden vegetables
- helped in developing the Red River agricultural backbone--wheat and potatoes
- used oxen drawn carts to carry goods

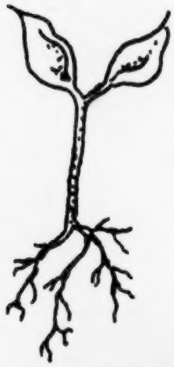
MARQUIS DE MORES

- wealthy Frenchman
- began a ranching business in southwestern North Dakota
- named a town after his wife, Medora
- built a meatpacking plant along the railroad line
- the plant failed during the winter of the White Death, 1886-87

THEODORE ROOSEVELT

- a New Yorker
- owner of the Maltese Cross Ranch
- owner of the Elkhorn Ranch
- President of the United States
- leader of the famous regiment known as "Rough Riders"
- quoted as saying, "I would never have been President if it had not been for my experiences in North Dakota."

OSCAR WILL



- a nurseryman from New York
- bought a seed company in Bismarck
- collected millions of tree seedlings from river banks
- sold healthy trees to homesteaders to help fill their tree claims
- experimented and developed a new corn variety called Dakota White Flint
- Dakota White Flint yielded high quality corn
- a person to whom many homesteaders owed their homes and success

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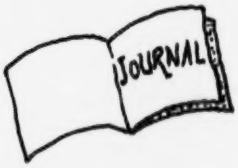
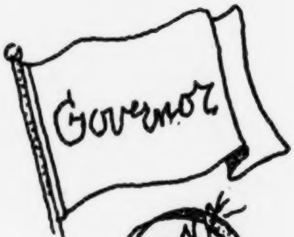
N.D. HALL OF FARM FAME NOMINEES

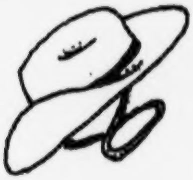
How much can you recall about the nominees who played an important part in North Dakota's agricultural history? Match the name with the important contribution by drawing a line from the name to the symbol.

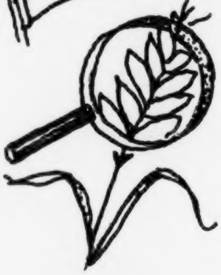
TEDDY ROOSEVELT





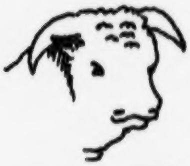
EDWIN LADD



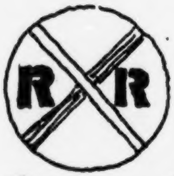


OSCAR WILL

ALEXANDER HENRY



H.L. BOLLEY



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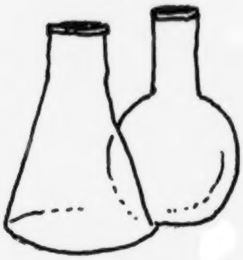
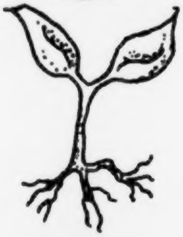
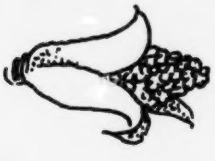


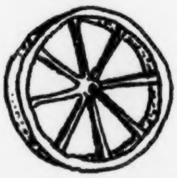


JOHN BURKE

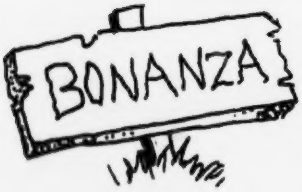
INDIANS

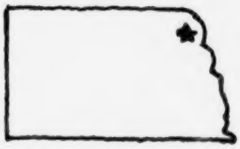


MARQUIS DE MORES



OLIVER DALRYMPLE





JAMES HILL

THOMAS DOUGLAS

FARMING-CAREERS
(Encyclopedia/Dictionary Category Search)

SUPPLIES: encyclopedia dictionary

INTRODUCTION: Did you realize that 40 percent of all the jobs, occupations and careers in our country have something to do with agriculture? A complete list would include more than 500 distinct occupations.

Farming has created many jobs for the non-farming sector of our economy. Every year, farmers alone spend close to $60 billion for goods and services to produce crops and livestock. At the same time another $15-billion is spent for the same thing that city people buy. This includes such things as food, clothing and other consumer products and services.

Thus farming is producing two-fold!

PROCEDURE: 1. Pass out the ditto entitled, "Careers in Agriculture" and make sure the students are familar with the vocabulary.

2. Remind the students that this is merely a partial listing of the 500 jobs directly or indirectly related to agriculture.

3. Pass out the ditto entitled, "Careers in Agriculture Category Sheet" for students to complete in either of two ways with the aid of encyclopedias and/or dictionaries.

A) Students may work independently, or
B) Teacher-directed class activity

4. Some careers may fit more than one category. For example: "meteorologist" may be placed under two categories; Science and Research, or Communications.
(**Accept any category choice provided the student can justify his/her answer.)

FARMING-CAREERS continued

ANOTHER IDEA: The teacher may wish to use this activity for small groups in a timed relay.

-Make a bulletin board entitled, "Agriculture Provides Jobs for the U.S.A."

-Collect "Help Wanted" advertisements and classify available positions by agricultural categories.

-Using publications, magazines, brochures or other informational sources, have the students prepare collages, draw pictures or write reports about a particular area. These might be placed in the "County Fair" described in a later activity.

-Invite in a representative from one of the eight areas. Have him speak on the duties, qualifications, training, etc. of this particular career.

-Do a class survey of the various occupations the students' parents are engaged in. How many are farm-related? If it is about 40%, your class is within the national average. Why might North Dakota's be more than this?

CAREERS IN AGRICULTURE CATEGORY SHEET

FARMING AND RANCHING	SCIENCE AND RESEARCH	MANUFACTURING INDUSTRY	BUSINESS	TEACHING AND EDUCATION	COMMUNICATIONS	CONSERVATION AND RECREATION	SERVICES

PHOTOGRAPHY
BANKING
Text of Zoology
CHEMISTRY

CAREERS IN AGRIC RE CATEGORY SHEET

FARMING AND RANCHING
- beekeeper
- dairyman
- farm manager
- farmer
- fruit grower
- livestock breeder
- poultry-man
- rancher

SCIENCE AND RESEARCH
- agronomist
- bacteriologist
- biochemist
- biologist
- biophysicist
- botanist
- engineer
- entomologist
- food chemist
- horticulturist
- meteorologist
- research technician
- scientist
- veterinarian
- zoologist
- geologist

MANUFACTURING INDUSTRY
- chemical producers
- electric power plants
- farm equipment specialist
- fertilizer products
- seed grower

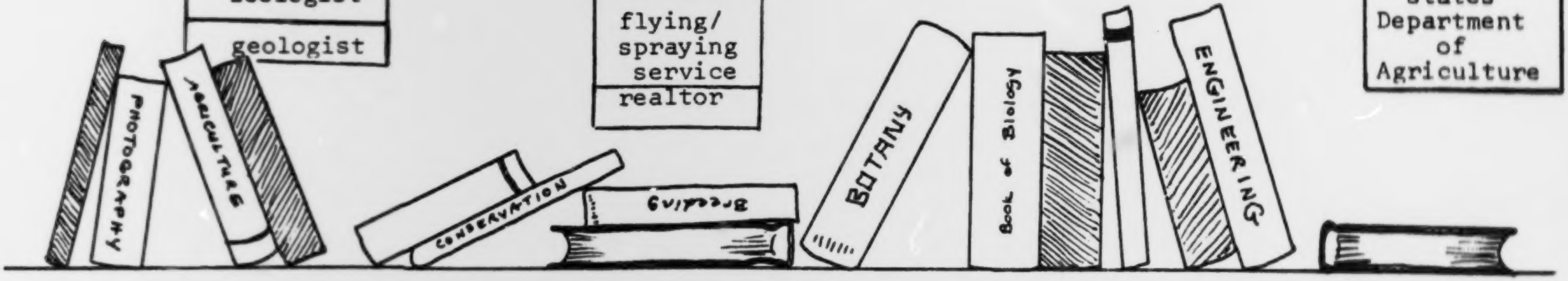
BUSINESS
- banking official
- dairy plant manager
- elevator manager
- farm appraiser
- farm machinery dealer
- farm planner
- feed dealer
- insurance broker
- salesmen
- seed broker
- flying/spraying service
- realtor

TEACHING AND EDUCATION
- agriculture consultant
- college faculty member
- food services
- home economist
- rural sociologist
- vocational agriculture

COMMUNICATIONS
- advertising agencies
- artist
- editor
- lay-out specialist
- meteorologist
- photographer
- radio or television announcer
- weatherman
- writer

CONSERVATION AND RECREATION
- anti-pollution programs
- commercial nurseries
- farm irrigation systems
- flood control projects
- soil conservationist
- water conservation specialist
- wildlife specialist

SERVICES
- County Extension Agent
- Food and Agriculture Organization of United Nations
- Food Administration
- Inspector (food or feed)
- Missionary
- Peace Corp
- Quality Control Specialist
- United States Department of Agriculture

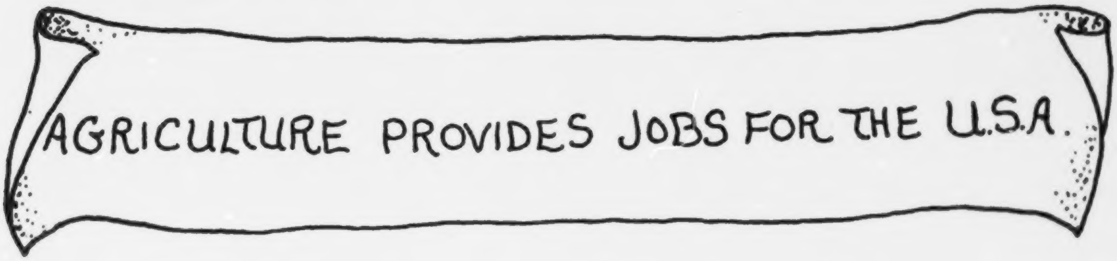


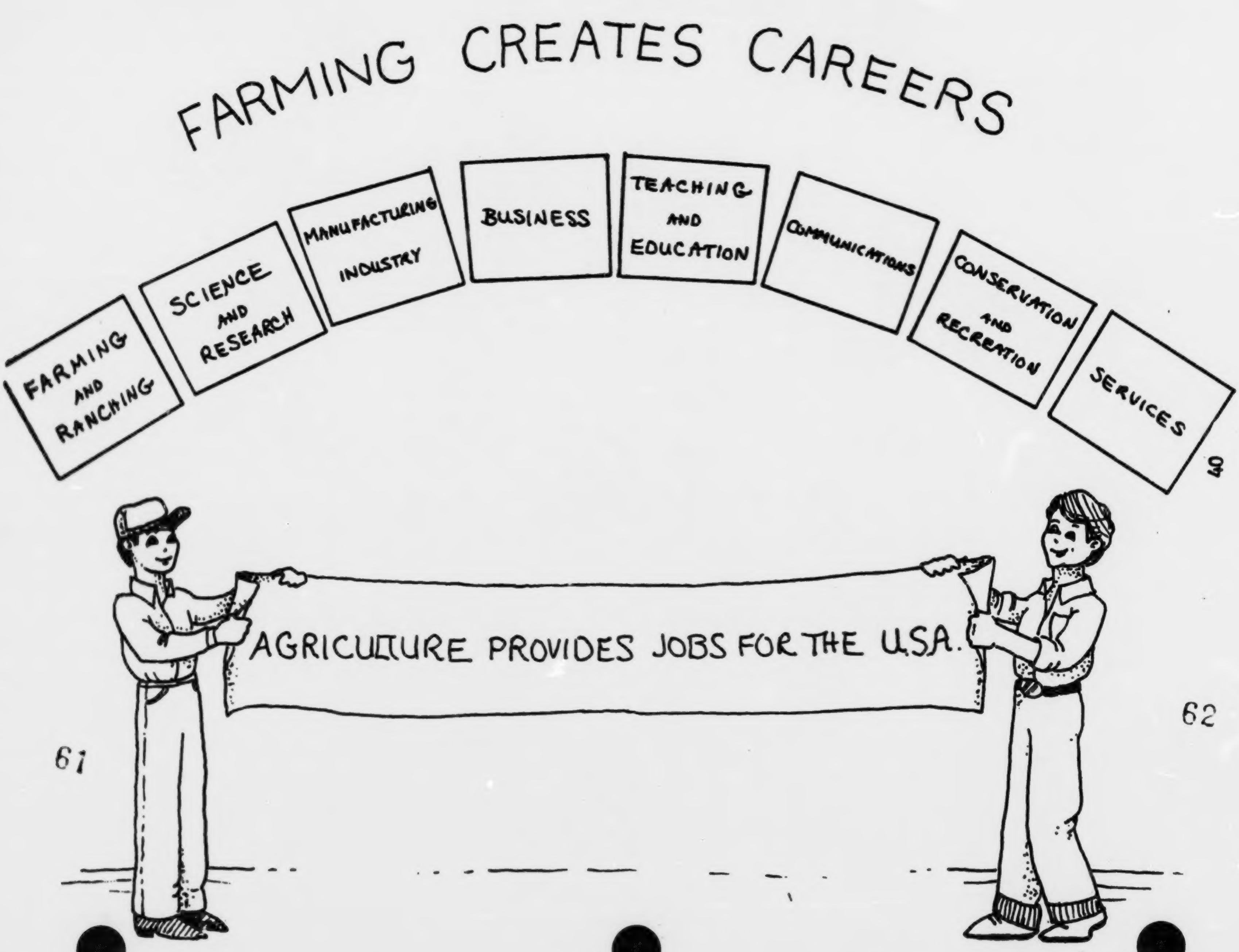
CAREERS IN AGRICULTURE

DIRECTIONS: Listed below are several of the more than 500 careers in agriculture and related fields. Using this list, complete the "Careers in Agriculture Category Sheet."

advertising agencies
agriculture consultant
agronomist
anti-pollution programs
artist
bacteriologist
banking official
beekeeper
biochemist
biologist
biophysicist
chemical producers
college faculty
commercial nurseries
County Extension Agent
dairyman
dairy plant manager
entomologist
editor
electric power plants
elevator manager
engineer
farm appraiser
farm equipment specialist
farm irrigation systems
farm machinery dealer
farm manager
farm planner
feed dealer
flood control projects
flying/spraying service
Food Administration
food services
food chemist
farmer
fertilizer products

Food and Agriculture Organization
fruit grower
geologist
home economist
horticulturist
inspector (food or feed)
insurance broker
lay-out specialist
livestock breeder
meteorologist
missionary
Peace Corp
photographer
poultryman
quality-control specialist
radio or television announcer
rancher
realtor
research technician
rural sociologist
salesman
scientist
seed broker
seed grower
soil conservationist
U.S.D.A.
veterinarian
vocational agriculture
water conservation specialist
weatherman
wildlife specialist
writer
zoologist
botanist


AGRICULTURE PROVIDES JOBS FOR THE U.S.A.


FARMING CREATES CAREERS
FARMING AND RANCHING
SCIENCE AND RESEARCH
MANUFACTURING INDUSTRY
BUSINESS
TEACHING AND EDUCATION
COMMUNICATIONS
CONSERVATION AND RECREATION
SERVICES
AGRICULTURE PROVIDES JOBS FOR THE U.S.A.

40

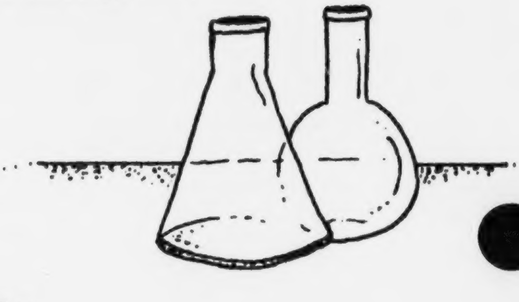
A CAREER"IST" SEARCH
(Dictionary Activity)

There are many "ist" occupations that can be related to agriculture. Match the following careers with their related jobs. Use reference books to help you.

____ 1. Agronomist
____ 2. Anthropologist
____ 3. Agriculturist
____ 4. Bacteriologist
____ 5. Biochemist
____ 6. Biologist
____ 7. Biophysicist
____ 8. Botantist
____ 9. Conservationist
____10. Economist
____11. Entomologist
____12. Geophysicist
____13. Horticulturist
____14. Hydrologist
____15. Meteorologist
____16. Microbiologist
____17. Pedologist
____18. Zoologist

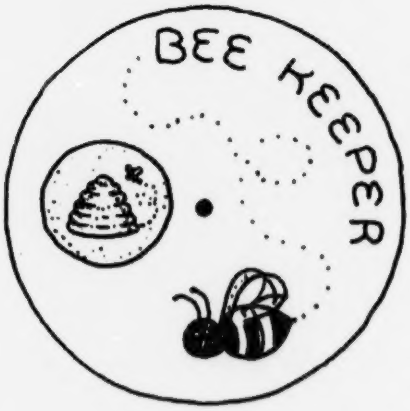
A. Studies the soil
B. Scientific study of plants
C. Studies insects
D. Scientific study of farming methods
E. Studies water
F. Studies the atmosphere
G. Studies the production and distribution of goods and services
H. Studies chemicals in living things
I. Studies animals
J. Studies beekeeping
K. Studies the physics of living things
L. Studies the raising and caring of plants
M. Studies living things seen through a microscope
N. Studies the physics of geology
O. Studies and supports saving the natural environment
P. Studies man
Q. Studies bacteria
R. Studies living things

(Answers found on page 263)



FARMING CAREER SCOPES

(Career research activity)



SUPPLIES:

tag board
brads
colored pencils
crayons
markers
task illustration page
cover page

INTRODUCTION:

Agriculture is far more than growing crops, important as it is. Agriculture is the foremost and largest of all America's industries.
The opportunities in agriculture related careers are as varied and abundant as our nations.

PROCEDURE:

1. Use the ditto entitled "Careers in Agriculture."

2. Each student may select a career they would like to research.

3. After researching, choose 4 important tasks related to that career.

4. Write a caption to explain the task and illustrate it in the four circles provided on the task illustration page.

5. Illustrate and title your cover.

6. Be creative and elaborate but keep your illustrations simple on both the cover and task page.

7. Assemble your career-scope circle book. Place a brad in the center to join the two circles together.

ANOTHER IDEA:

Use the scope books to illustrate other farm related things such as:

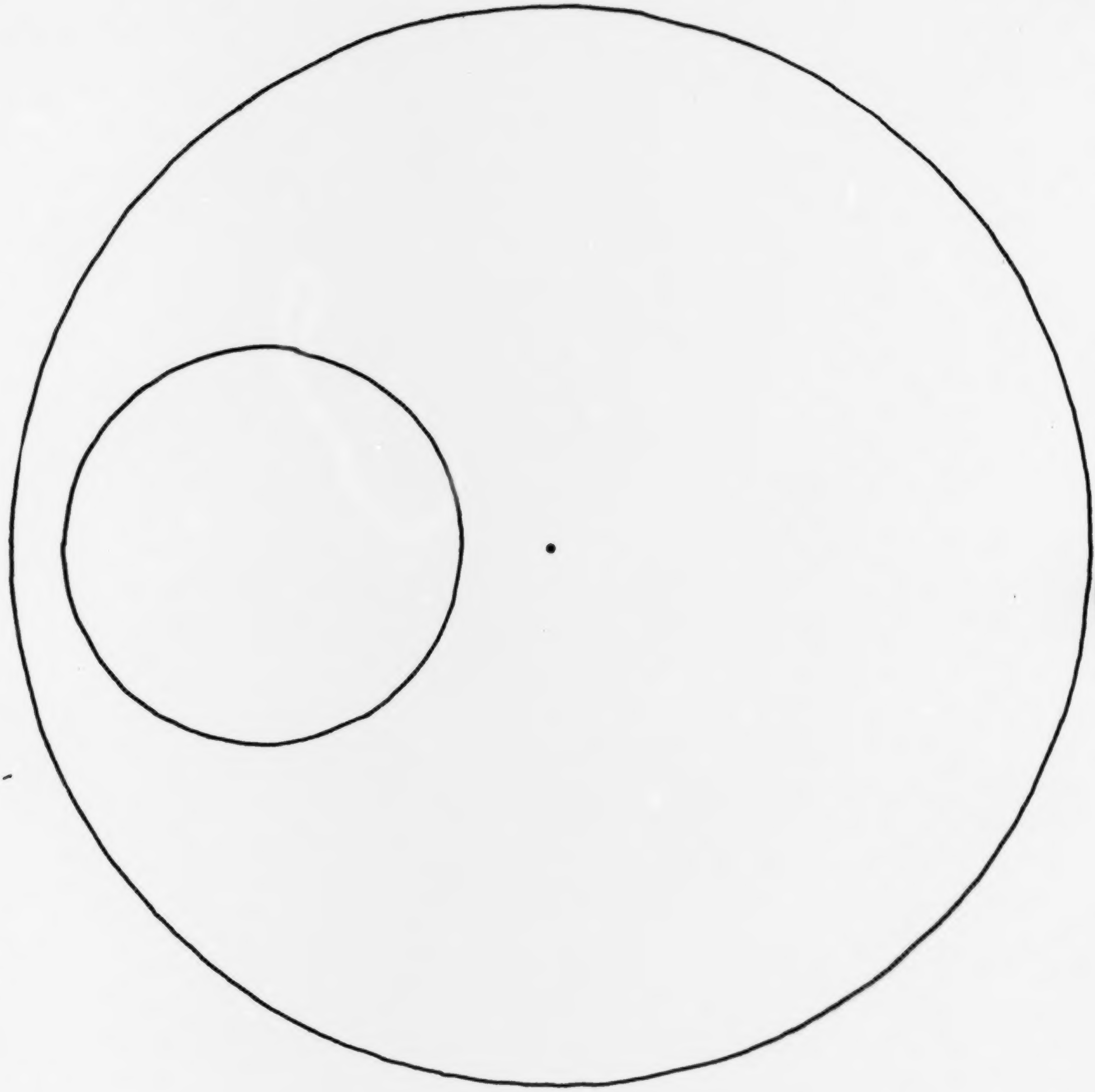
1. By-products of N.D. crops

2. By-products of N.D. livestock

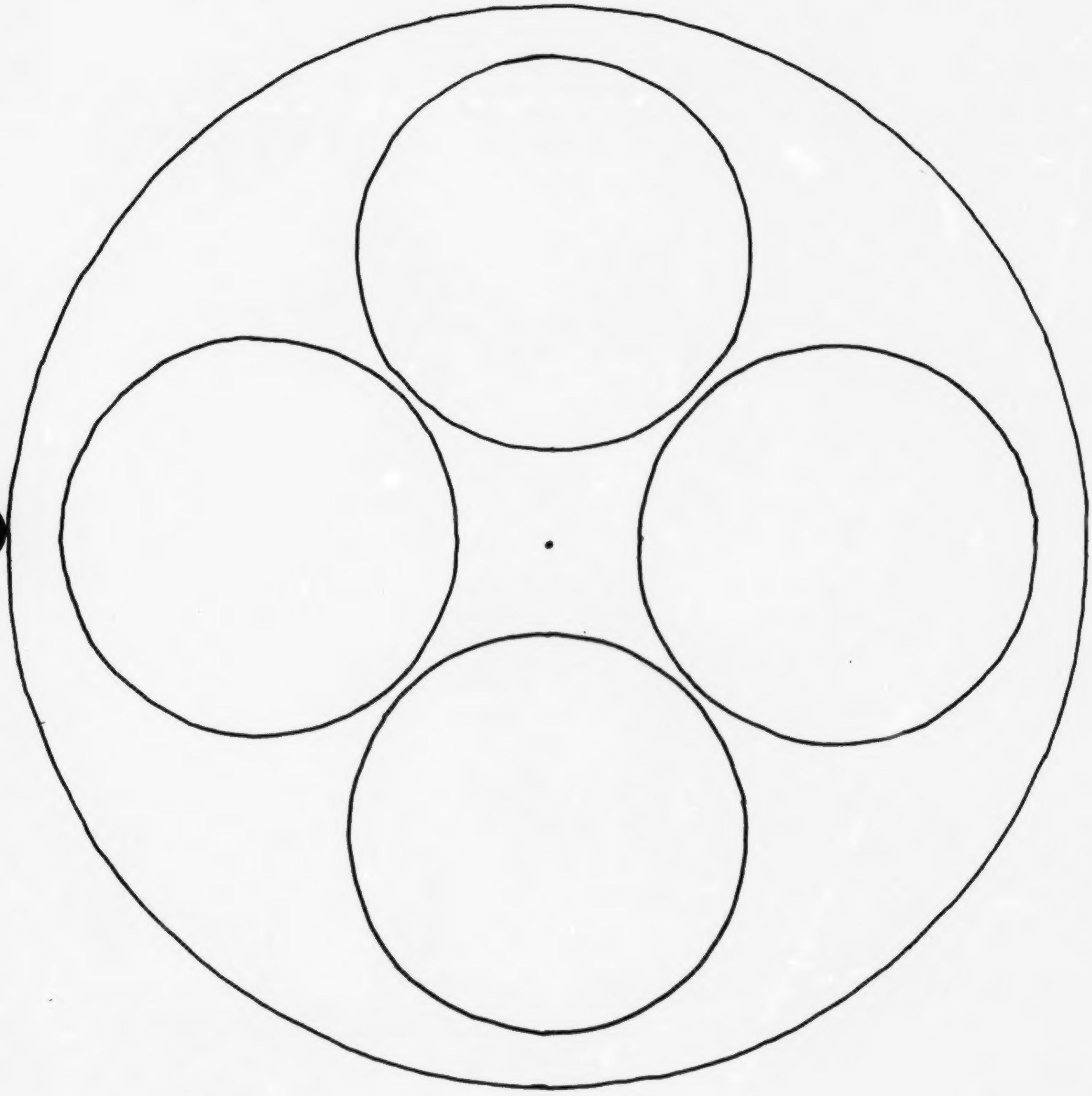
3. Hall of Farming Fame reports

4. Machinery and their uses

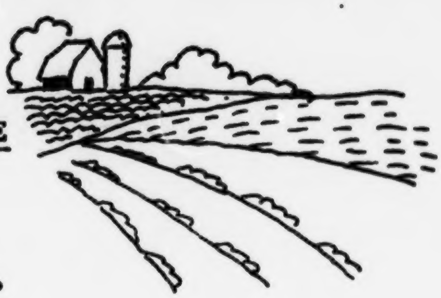
CAREER SCOPE COVER PAGE



CAREER SCOPE TASK ILLUSTRATION PAGE



THE HISTORY OF EARLY AGRICULTURE
MAN AND FOOD-GATHERING



SUPPLIES: ditto of 10 titles

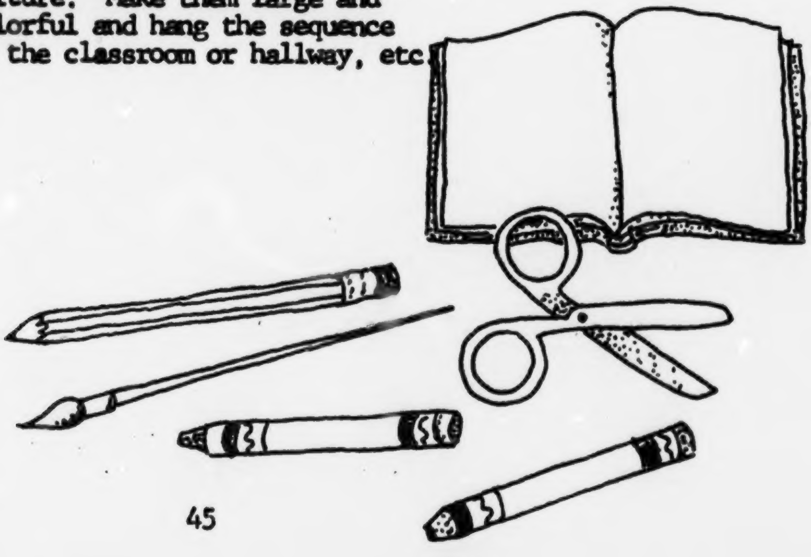
INTRODUCTION: Analyze and arrange in sequence, ten steps in the history of agriculture.

PROCEDURE:
1) Pass out the dittoes and allow the children time to analyze the pictures.
2) After sufficient time, ask the children to cut out the squares and place them into a logical time sequence.
3) Allow several students to share their steps in analyzing the history of agriculture.
4) Discuss the correct order of the 10 steps and list examples of each one as they are directly related to North Dakota. (See next page).

ANOTHER IDEA: The teacher may wish to use this same activity as an evaluation tool at the end of the unit.

Choose one of the ten steps and research it for a report on one aspect of the history of North Dakota agriculture.

The class may went to draw their own pictures to illustrate the ten steps and write captions to North Dakota's history of agriculture. Make them large and colorful and hang the sequence in the classroom or hallway, etc.



THE HISTORY OF EARLY AGRICULTURE
MAN AND FOOD-GATHERING

This list is a start of North Dakota related items for you and your students to begin with.

(1) Food-gathering--chokecherries, buffalo berries, plums, juneberries, ground beans, roots of tipsin, grapes

(2) Hunting and fishing--rabbit, buffalo, perch, trout

(3) Tools and weapons--pointed digging sticks, hoes of buffalo shoulder blades, rakes of deer antlers

(4) Preserving and storing--dried meat, pemmican

(5) Agriculture--Indians produced: corn, beans, squash, sunflower,
Metis: corn, barley, oats, potatoes, wheat, tobacco, garden vegetables

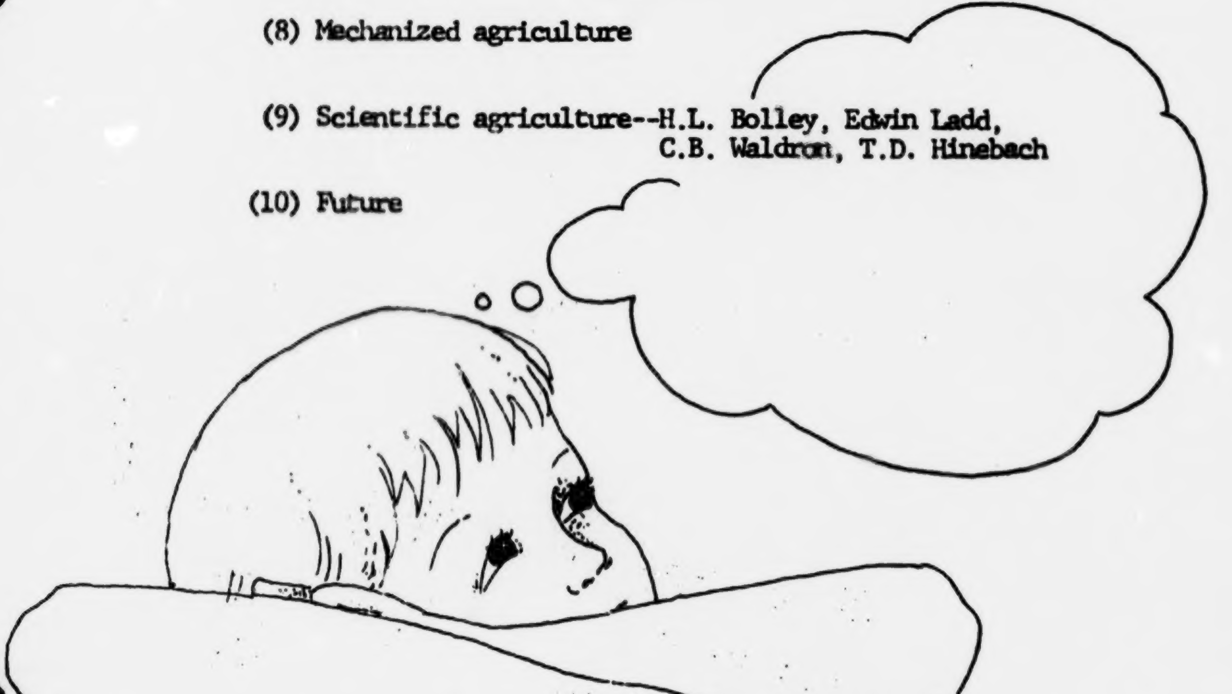
(6) Use of animals and plows--fertilizing, cultivating

(7) New discoveries--irrigation, plant selection, Oscar H. Will

(8) Mechanized agriculture

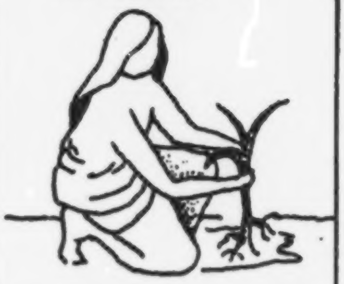
(9) Scientific agriculture--H.L. Bolley, Edwin Ladd, C.B. Waldron, T.D. Hinebach

(10) Future

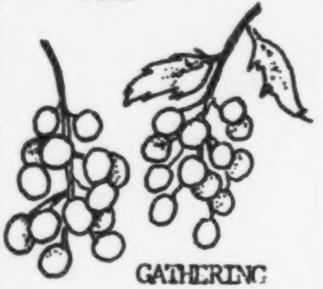


THE HISTORY OF EARLY AGRICULTURE
MAN AND FOOD-GATHERING

AGRICULTURE

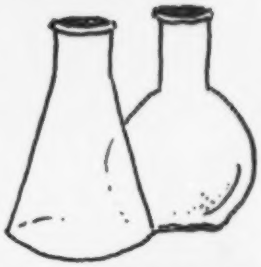


FOOD



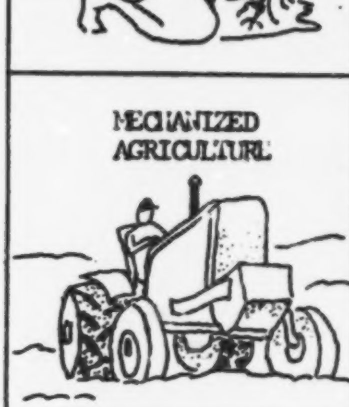
GATHERING

SCIENTIFIC

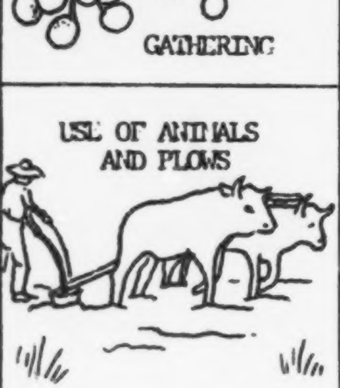


AGRICULTURE

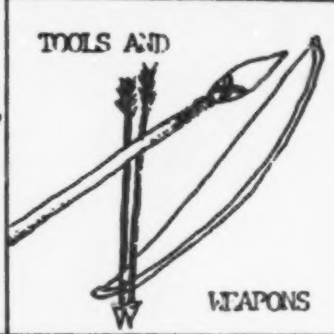
MECHANIZED
AGRICULTURE



USE OF ANIMALS
AND PLOWS

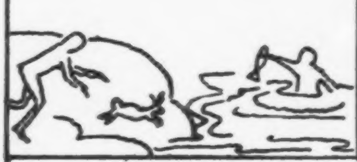


TOOLS AND

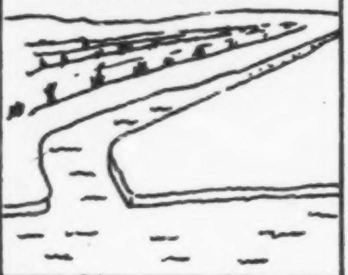


WEAPONS

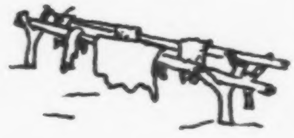
HUNTING
AND
FISHING



NEW DISCOVERIES



PRESERVING
AND
STORING



?

MANDAN ARIKARA·HIDATSA

North Dakota's very first farmers!

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "Mandan, Arikara, Hidatsa."
2. You may not use proper nouns such as DAN.
3. Plurals are allowed.
4. Each letter may be used only once. For example: DAD is okay but MADAM is not because of the two m's.

*There are over 120 words! How many can you find?

1. ________________
2. ________________
3. ________________
4. ________________
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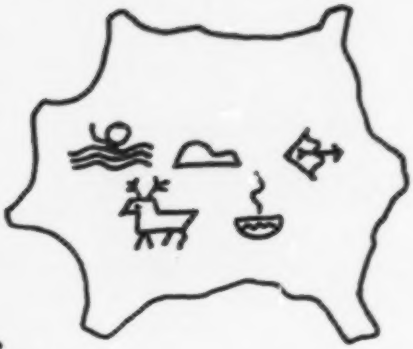
31. ________________
32. ________________
33. ________________

(Answers found on page 58)

INDIAN REBUS
(Historical-creative writing)



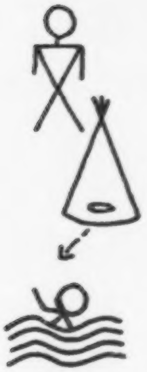
SUPPLIES:
grocery sack
colored pencils
markers
crayons

INTRODUCTION:

The Mandan, Arikara and Hidatsa were the first farmers of our state. Along the Missouri, Knife and Heart rivers they planted beans, wild sunflower, squash and corn.

The women tended fields along the river bottoms with crude tools such as pointed digging sticks, hoes made from buffalo shoulder blades and rakes made from deer antlers.

PROCEDURE:



1. Have the students read the section, "The First Farmers" on page 23 from the Project Study booklet, The First People of North Dakota.

2. Create a "rebus" about a particular aspect of the first farmers of North Dakota.

3. Encourage the students to incorporate as many Indian symbols as possible to replace the words in their story.

4. Sample symbols may be shown to the students to get them started in designing their own rebus and key.

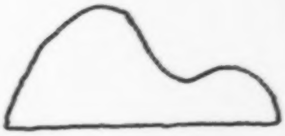
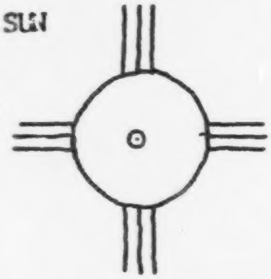
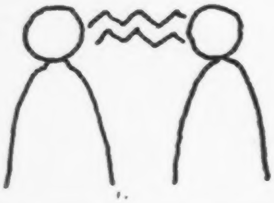
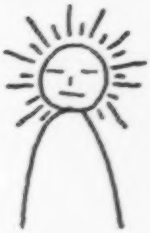
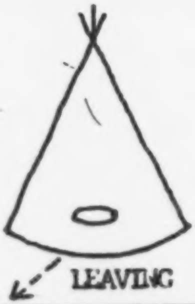
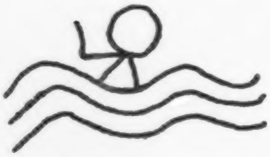
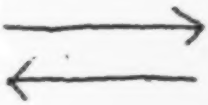
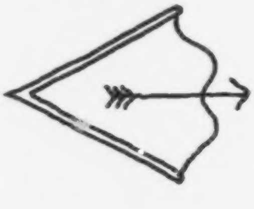
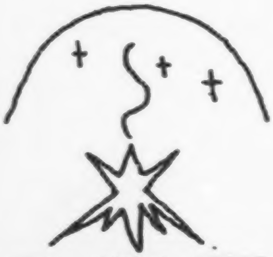
5. The final product may be mounted on the following art activity.

Grocery Sack Animal Skins

1. Tear a large grocery sack into the shape of an animal skin.
2. In pencil, place your rebus story with symbols on the sack.
3. Correct any mistakes, then go over the story with fine tip markers, crayons, etc.
4. Wrinkle and crumble the sack several times to give it an old animal skin look.

**Don't forget your rebus answer key for the symbols used!
**Share your rebus story on a hallway bulletin board!

INDIAN REBUS

HILL 	SUN 	TALK TOGETHER 
WISE MAN 	 LEAVING	 SWIM RIVER
WAR 	HUNT 	 FIRE UNDER STARS

EVERYTHING SPRINGS FROM THE LAND
(A Comparison Activity)

SUPPLIES:

Landscape of 1870
Landscape of 1984
Landscape Illustration
scissors
glue
markers

INTRODUCTION:

North Dakota is alive! Picture the prairie as it looked many years ago. From the eastern horizon to the western horizon, it was a great sea of grasses, thick, waist-high in some places, and waving in the wind. It was a free space for buffalo to roam and Indians to hunt. The prairie was in a completely natural state. Picture the land as it is today. From the east to the west there are fertile fields of grain, herds of cattle, farmsteads and ranches, fences, shelter belts, pipelines, highline wires, towns and cities with highways and telephone lines to connect them. All this change has taken place because North Dakota is a fertile land. This means that we have plenty of rich soil which can produce valuable food. Everything springs from the land.

PROCEDURE

1. Share the introduction with the students.

2. Lead a discussion with the students on how the landscape of N.D. in 1870 would compare with 1984.
    - How would it be different?
    - How would it be the same?

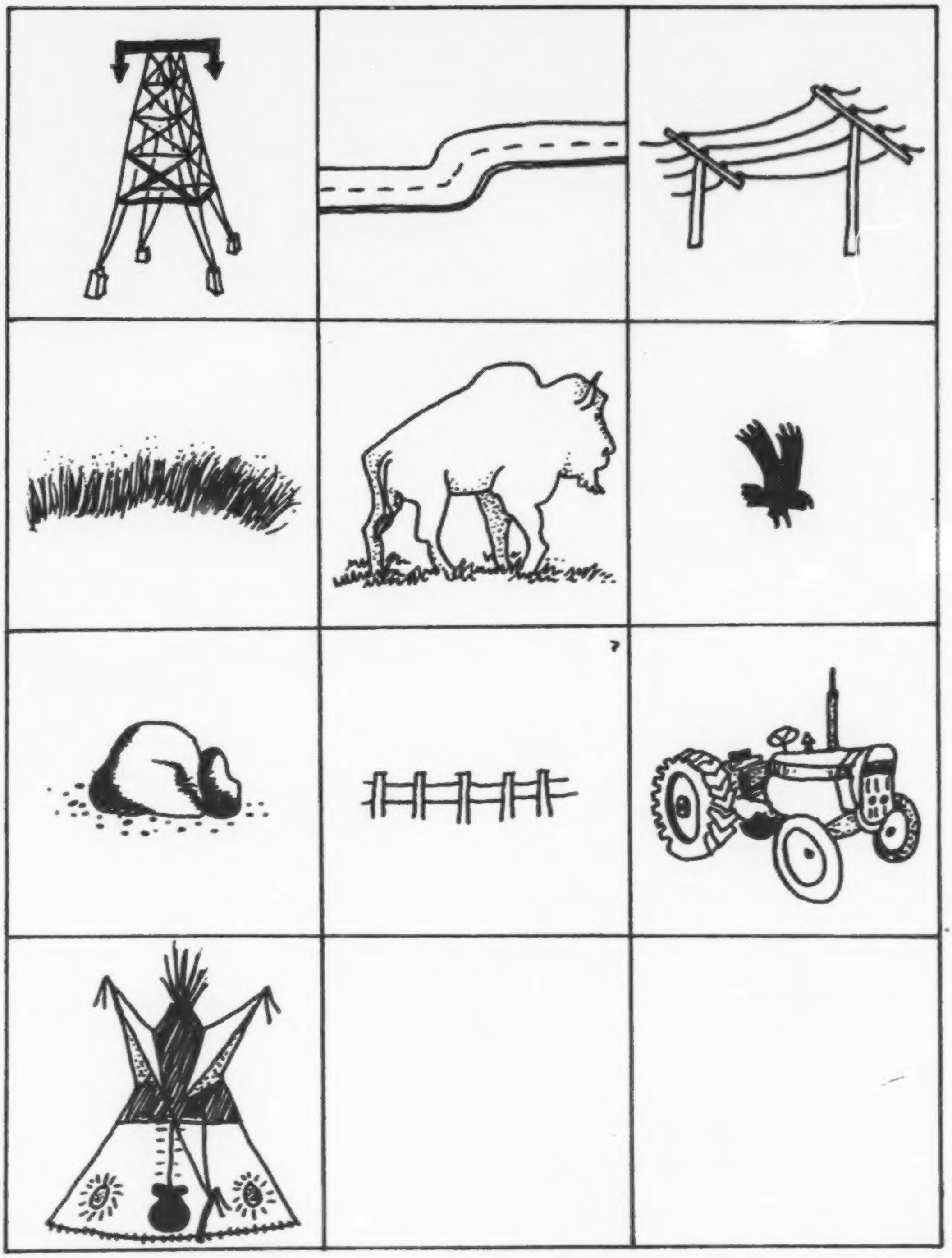
3. Brainstorm the following questions and list the students' responses on the chalk board.
    - What kind of things sprang from the land in 1870?
    - What kind of things spring from the land in 1984?
    - What would be found on the landscape of N.D. in 1870? in 1984?

4. Allow time for the students to defend how each item "springs from the land."

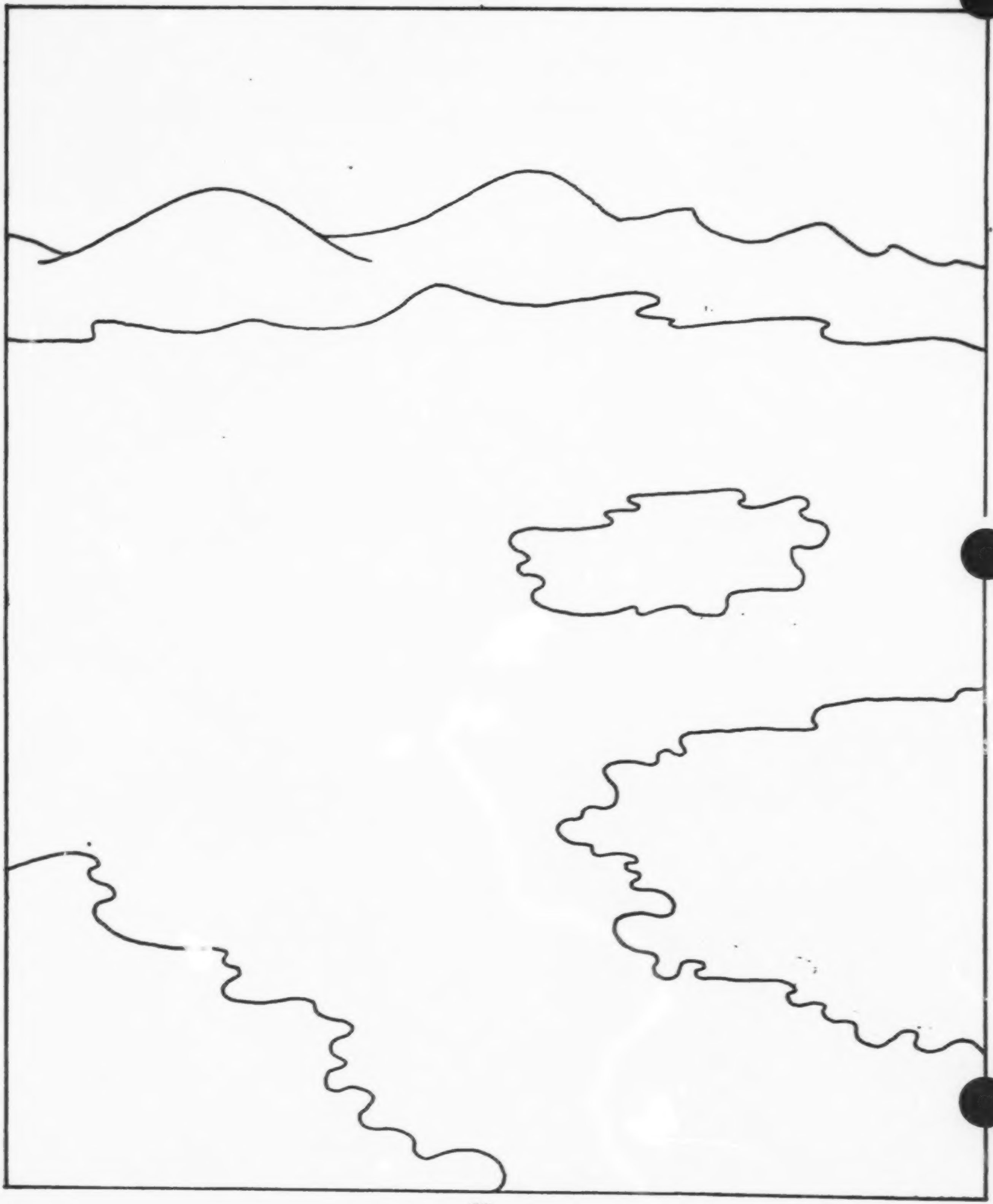
5. Distribute the three ditto pages.

6. Students may cut out the illustration and place them on the correct landscape page. Two squares have been left for students to illustrate their own pictures. This is only a start, encourage the students to add as many items as they wish to make a detailed and interesting comparison of things that have sprang from the land.

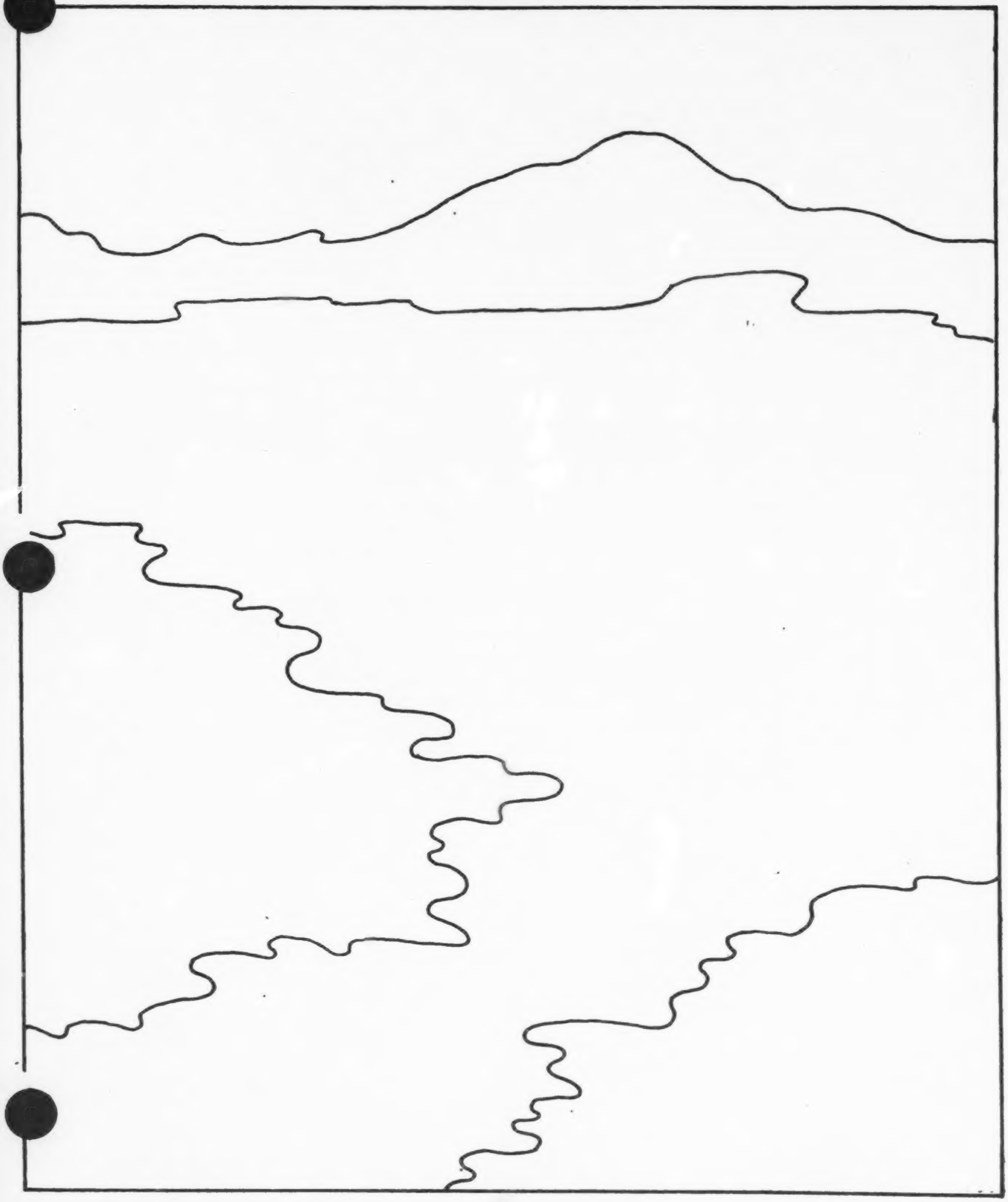
Landscape Illustration

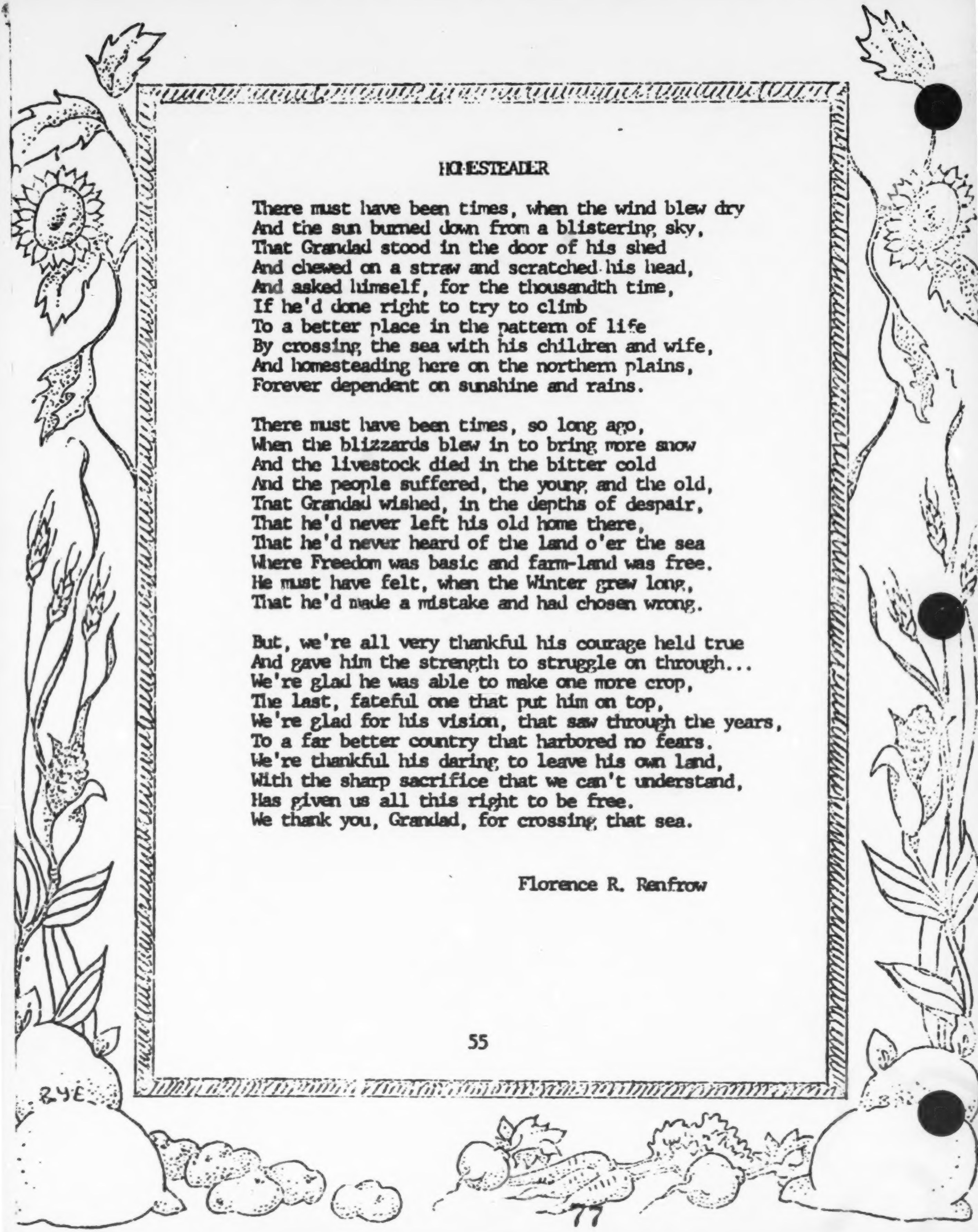


Landscape of 1870



Landscape
of
1984





HOMESTEADER

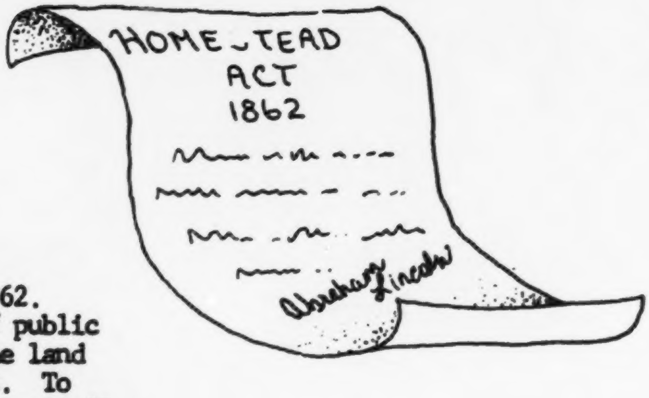
There must have been times, when the wind blew dry
And the sun burned down from a blistering sky,
That Grandad stood in the door of his shed
And chewed on a straw and scratched his head,
And asked himself, for the thousandth time,
If he'd done right to try to climb
To a better place in the pattern of life
By crossing the sea with his children and wife,
And homesteading here on the northern plains,
Forever dependent on sunshine and rains.

There must have been times, so long ago,
When the blizzards blew in to bring more snow
And the livestock died in the bitter cold
And the people suffered, the young and the old,
That Grandad wished, in the depths of despair,
That he'd never left his old home there,
That he'd never heard of the land o'er the sea
Where Freedom was basic and farm-land was free.
He must have felt, when the Winter grew long,
That he'd made a mistake and had chosen wrong.

But, we're all very thankful his courage held true
And gave him the strength to struggle on through...
We're glad he was able to make one more crop,
The last, fateful one that put him on top,
We're glad for his vision, that saw through the years,
To a far better country that harbored no fears.
We're thankful his daring to leave his own land,
With the sharp sacrifice that we can't understand,
Has given us all this right to be free.
We thank you, Grandad, for crossing that sea.

Florence R. Renfrow

HOMESTEADING



SUPPLIES:
poster paper
markers
construction paper

INTRODUCTION:
President Lincoln signed the Homesteader's Act in May of 1862. This Act provided 160 acres of public land if the person lived on the land for five years and improved it. To qualify, a person needed to be over 21, a head of a family and either a citizen or an alien who intended to become a citizen. Or, for the price of $1.25 an acre, in place of the 5-year residency requirement, a person could purchase the land.
The railroads needed the homesteaders' business. Thus they engaged in an extensive advertising campaign throughout eastern America and Europe. Often the advertisements were slightly misleading! The Dakota Territory was pictured as the promised land!! The railroads even promised to help settle the new homesteaders once they arrived.

PROCEDURE:

1. Have selected students research why Europeans would want to leave Europe for the U.S. (Overpopulation, starvation, lack of jobs, hard to get ahead, etc.) Have them share these facts with other students in an oral report.

2. Why would the Dakota Territory, "free" land and a fresh start look so good to these people?

3. Have each student pretend to be a railroad agent engaged in promoting the "Homestead Act" in Europe.

4. Create a poster to entice these Europeans to Dakota Territory. Think of all the positive attitudes that really do exist in North Dakota.

5. Encourage the posters to have large clear drawings, neat bold lettering, and bright colors.

6. Create and vote on the most convincing poster.

ANOTHER IDEA: Pretend to be a newly arrived immigrant. Write a letter back home encouraging others to come to the prairie, too!

-Research how many settlers the Homestead Act did attract to the Plains area.

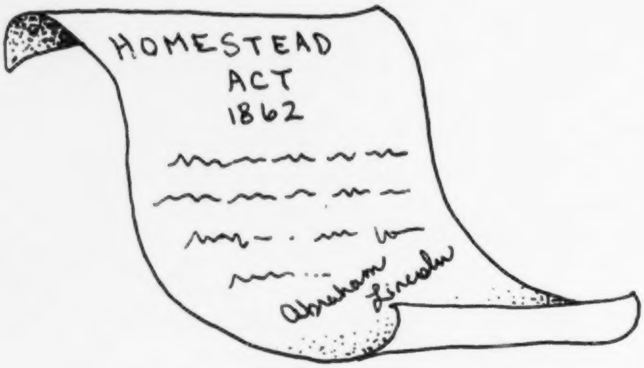
-Research the Timber Culture Act (commonly called the Tree Claim). How did it differ from the Homestead Act?

THE HOMESTEAD ACT

This Act enticed many people to settle in North Dakota and other western parts.

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "The Homestead Act."
2. You may not use proper nouns such as TOM.
3. Plurals are allowed.
4. Each letter may be used only once. For example: SEEM is okay but TOSS is not because of the two s's.



*There are over 80 words! How many can you find?

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
10. ____________________
11. ____________________
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25. ____________________
26. ____________________
27. ____________________
28. ____________________
29. ____________________
30. ____________________
31. ____________________
32. ____________________
33. ____________________

SUGGESTED ANSWERS FOR "MANDAN, ARIKARA, HIDATSA" WORD HUNT. .

ads
aid(s)
aim(s)
air
and
ant(s)
ark
arm(s)
art(s)
ask

dad
dam(s)
dark
darn(s)
dart(s)
dash
data
dim(s)
dirt
dish
disk

had
hair
ham
hand(s)
hark
harm(s)
has
hat(s)
hid
him
his

ink
inn(s)
irk(s)

kin
kind

mad
maid(s)
main

man
mar(s)
mark(s)
mart
mask
mast
mat(s)
math
mint(s)
mist

raid(s)
rain(s)
ram(s)
ran
rank(s)
rat(s)
rid(s)
rim(s)
rink(s)
rind(s)

sad
said
sand
sank
sat
shark
shin
shirt
shirk
shrink
sin
sink
sit
stair
stand
star
stark

tan(s)
tank(s)
tar
task

than
thank
thin
think
this
tin

SUGGESTED ANSWERS FOR "THE HOMESTEAD ACT" WORD HUNT . . .

act(s)
ads
ash
atom(s)
attach
attache

came
cat(s)
cease
chase
chat(s)
cheat(s)
cheese
chose
come(s)

dam(s)
dame(s)
dash
date(s)
death
deem
does
dome(s)

ease
east
eat(s)

had
hash
haste
hat(s)
head
hem(s)
host
hot

mach
macho
mad
made
mash
mast
math
mesa
mode
most

oath
ode

sad
same
sat
seem
shade
shame
she
shed
sheet
some
stem

tact
tame(s)
taste
tease
test
toast
toes
that
them
these
those

SOLUTIONS - PROBLEMS = SURVIVAL
(An analytical-historical game)

SUPPLIES: problems and answer sheet dittoes
teachers answer key
scissors
paste or glue

INTRODUCTION: Advertising used to entice homesteaders to settle in North Dakota was often misleading. Many came with the vision that the West was a paradise because of what they had been told.
Once the homesteaders settled in North Dakota they faced many new problems. Some failed and went back East. But many did survive through courage and hard work.

PROCEDURE:

1. Use the introduction with the class as a warm-up discussion about the problems homesteaders faced in North Dakota.

2. Tell the students you will be giving them a sheet of homesteading problems and solutions to match up correctly.

3. Before passing out the sheets, give the students an opportunity to predict what some of these problems and their solutions might be.

4. Pass out the sheets.

5. After allowing sufficient time for completion of the matching activity, take time to discuss the survival solutions.

6. Challenge your class to add to this chart other problems and solutions for survival by the homesteaders.

ANOTHER IDEA:

1. Have the class construct their own "flip" book of problems and solutions. Be sure to encourage originality as well as authenticity of problems and solutions.
2. Students may want to try their hand at making other problem-solution books such as; soil erosion,
   farmers enemies-insects
   marketing
   Indians
3. Design a similar chart depicting present day farming or ranching problems and solutions, or
   future farming and ranching problems and solutions.

SOLUTIONS - PROBLEMS = SURVIVAL

(Student Problem Sheet)

1. Climate such as cold winters and wind

2. Lack of natural building materials such as stone and trees.

3. Lack of trees for fences

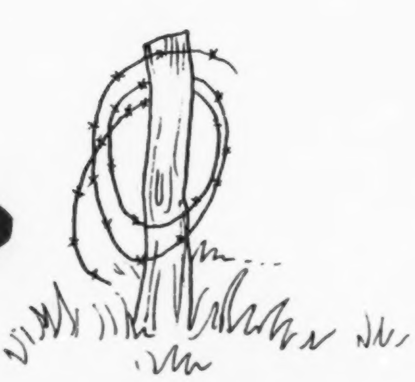
4. Scarcity of water

5. Thick, tough sod

6. Getting the crop to market

7. Dangers from Indians and wild animals, and disputes between cattlemen and farmers

8. Homesteading was a hard and lonely life



SOLUTIONS - PROBLEMS = SURVIVAL
(Student Solution Sheet)

DIRECTIONS: Match the following solutions to the correct problems on your chart.

A. Horse-drawn grain wagons, elevators and railroads

B. Barbed-wire fence

C. "Quilting" bees, cornhusking bees, house-raising socials

D. Build better shelters to survive

E. Rain-water barrels, windmills, wells, and dry farming

F. Establishment of forts, Indian reservations, law enforcement

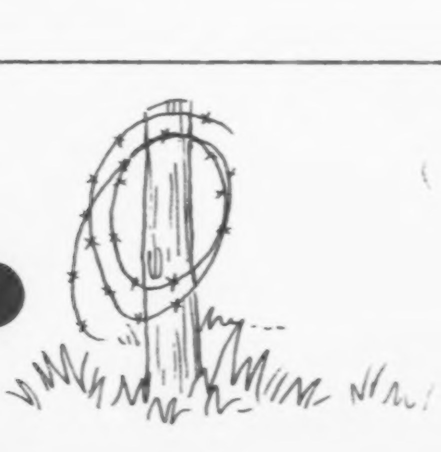
G. Dug-outs, sod-constructed homes (soddies), sun-dried bricks

H. Better equipment such as steel plows, disk harrows, and grain drills

SOLUTIONS - PROBLEMS = SURVIVAL

(Answer Sheet)

PROBLEMS ON THE PRAIRIE	SOLUTIONS FOUND BY HOMESTEADERS
1. Climate such as cold winters and wind	Build better shelters to survive
2. Lack of natural building materials such as stone and trees.	Dug-outs, sod-constructed homes (soddies), sun-dried bricks
3. Lack of trees for fences	Barbed-wire fence
4. Scarcity of water	Rain-water barrels, windmills, wells, and dry farming
5. Thick, tough sod	Better equipment such as steel plows, disk harrows, and grain drills
6. Getting the crop to market	Horse drawn-grain wagons, elevators, and railroads
7. Dangers from Indians and wild animals, and disputes between cattlemen and farmers	Establishment of forts, Indian reservations, law enforcement
8. Homesteading was a hard and lonely life	"Quilting bees," cornhusking bees, house-raising socials



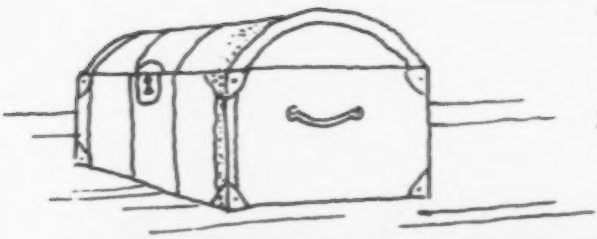
GRANDPAPPY OLSON'S TRUNK

(Creative-thinking activity)

SUPPLIES: Ditto of Grandpappy Olson's Trunk

INTRODUCTION: This exercise will allow the students to learn something about the tools from the past as well as create a new use for these old reliable tools.

PROCEDURE:



1. Ditto off the sheets entitled "Grandpappy Olson's Trunk." Distribute a set to each student.
2. Read the following directions to the class making sure everyone understands the purpose of the game.

Grandpappy Olson's will and testament states that his estate of $250,000 will be divided among his many grandchildren. However, there is one catch! Before any grandchild can receive any money he/she must prove his/her worth to Grandpappy Olson. Grandpappy wanted to make sure his money would be used creatively. In the will it states that each grandchild must go through Grandpappy's old trunk and find some "new" use for each object in it. Nothing can be sold; each item must be used in a fresh new way. Try to discover some really novel uses for these items!

3. Payment can be made one of several ways:

   A) First to finish with all complete takes all

   B) Money divided equally among all finishers

   C) Let the heirs and heiresses decide how payment should be made.

# ________

________ 19__

PAY TO THE ORDER OF ______________________ $______

______________________________ DOLLARS

FIRST FARMER'S BANK

____

GRANDPAPPY OLSON'S TRUNK

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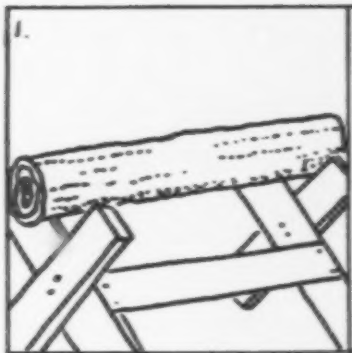

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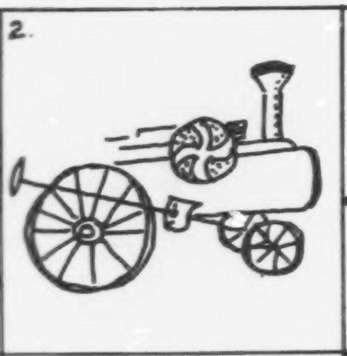

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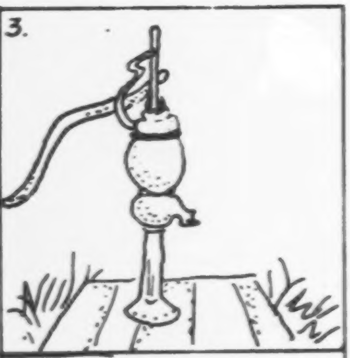

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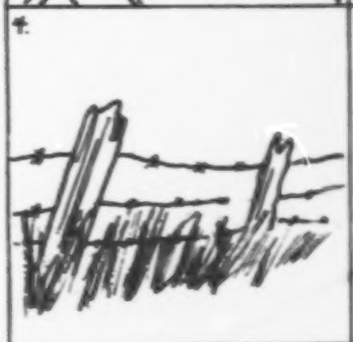

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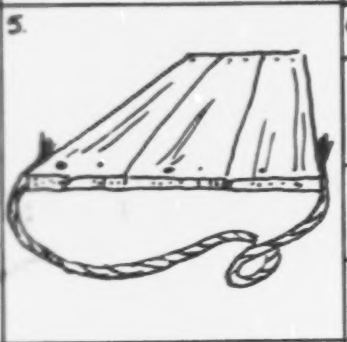

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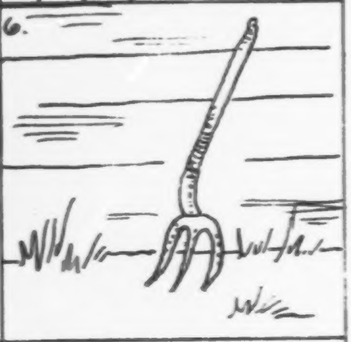

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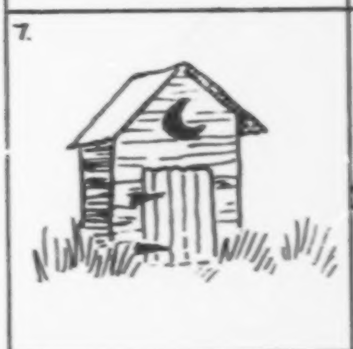

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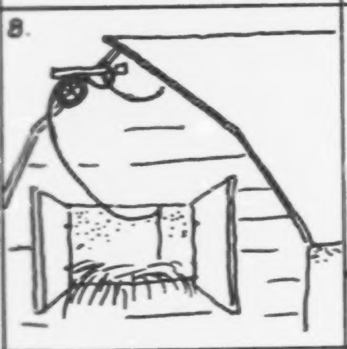

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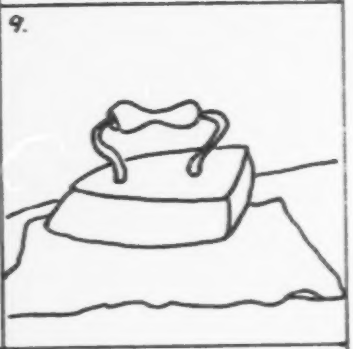

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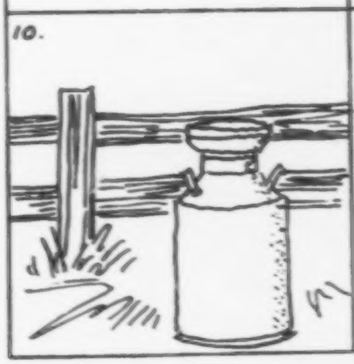

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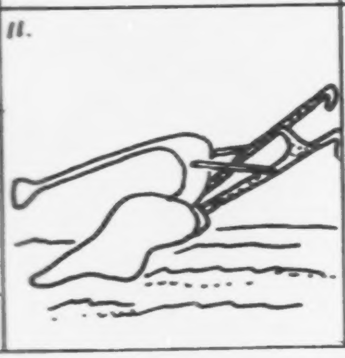

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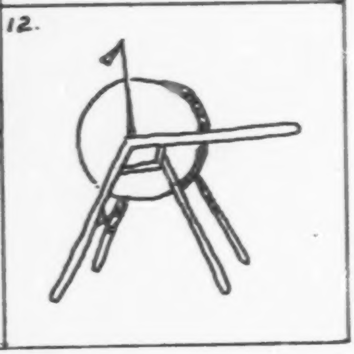
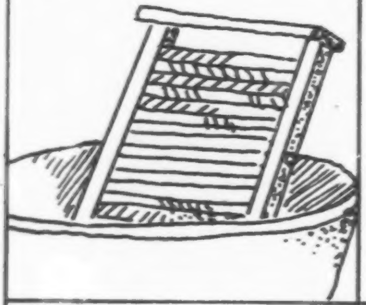


GRANDPAPPY OLSON'S TRUNK

13.



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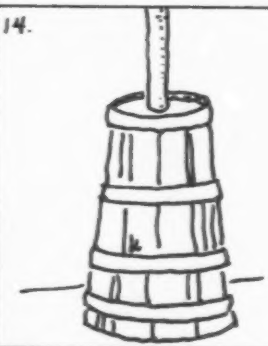

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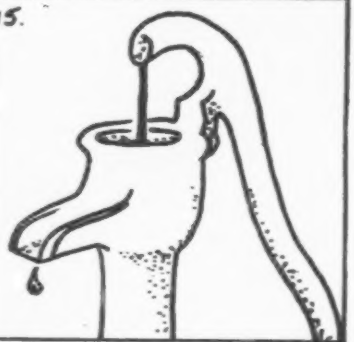

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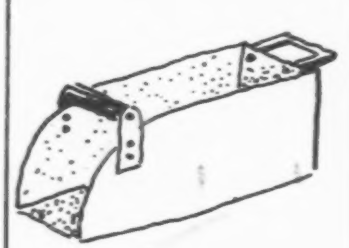

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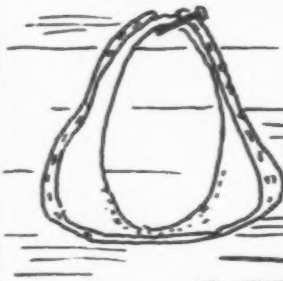

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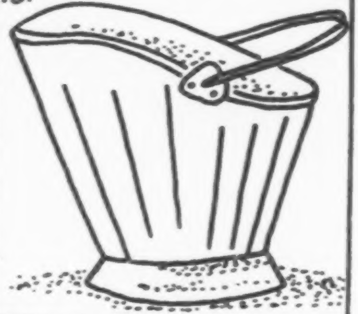

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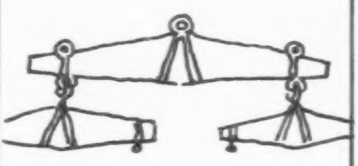

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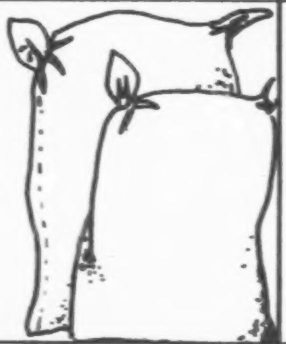

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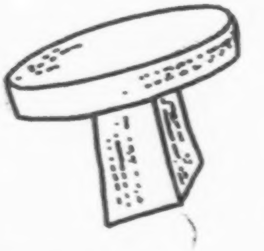

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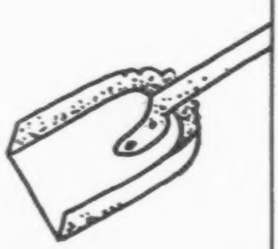

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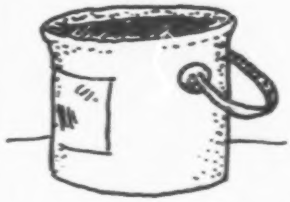

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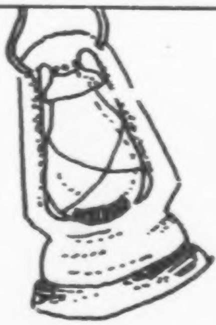


(Answers found on page 263)

FARM AUCTION SALE

"What'll you give me? What'll you give me?"
the auctioneer would yell,
In the old familiar cadence
that everyone knew well.
And the bids would mount in volume,
as the crowd began to swell,
And the bargaining continued,
in a high, hypnotic spell.
There would be some useless object,
but the fever would compel
The bidder past good judgment
and the auctioneer would sell
It to him with a flurry,
and the line would then propel
Another spurt of frenzy
and you wouldn't have time to tell
Just what it was you bid for,
but your doubts would soon dispel
As excitement sent you forward
and the crowd would surge, pell-mell,
Around another item
and the day would cast its spell
At an Auction in the Country
and you'd have no choice to tell.

Yes, it used to be a picnic
when the farmer in the dell
Put his chattel up for auction
and the auctioneer would sell
With a flourish and a wisecrack,
with a joke he'd have to tell,
And the neighbors and the townsmen
would respond to his gay spell
And buy an old, cracked pitcher
as a souvenir to tell
Of the day out in the country
with the folks they knew so well.

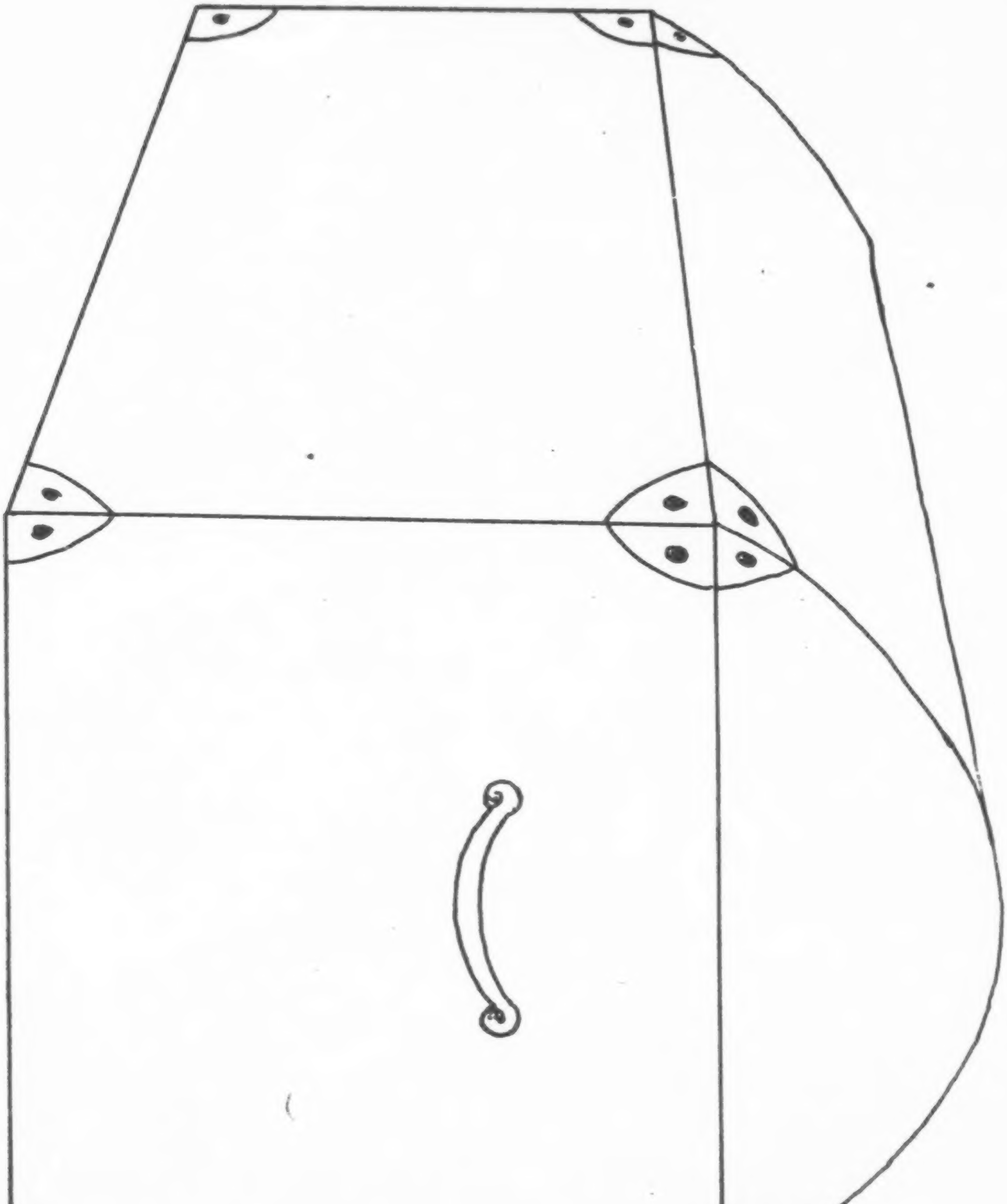
When the house stuff and machinery
was disposed of, then they'd sell
The livestock in the barnyard
with its own distinctive smell,
And when the day was over
and the evening shadows fell,
And silence spread its mantle
over every hill and dell,
Then there'd be a peace conclusive
and a man could feel its spell,
For the auction sale was over,
and everything was well.

Today, an auction's clamor
sounds a warning note to tell
That an auction in the country
is a somber funeral bell.
It used to be, an auction meant
there'd be a farm to sell,
And someone's older, married boy
would settle in, real well.
And the neighborhood continued,
and the countryside would swell,
As the little towns would prosper
under their communal spell.
Today, an auction's notice
is a death we're sad to tell,
No longer will a family
in its contentment dwell.
Today, an auction's notice
is indefensible
For it liquidates a farmstead
that we once knew so well.
Most often, it just added to
another farm to tell
That all our family units
are now dispensable.

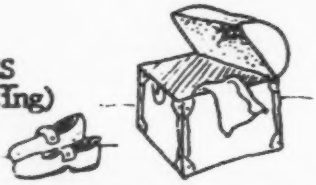
Continued loss of family farms
will be a debacle.
Our way of life is threatened
and our very souls rebel,
To think our days are numbered
and the land we love so well
Will soon be a statistic
in a list contemptible.
When human beings leave the land,
the loss if hard to tell.
There's no one there to be concerned
when things don't go so well.
There's no one there to hear the birds
in Spring's song cadence swell,
To see the seasons come and go
and all their blessings tell.
Conglomerations threaten us
and all the world, as well,
So, when you hear another
family farm is forced to sell,
Think twice before you 'help him out',
don't fall beneath the spell,
Just listen to the tolling
of your own funeral bell.

Florence R. Renfrow

TRUNK TALES TASK CARD



TRUNK TALES
(Creative writing)



1. What if this old trunk could talk? Think of the fascinating tale it could tell. When our early Dakota homesteaders came West to prove up on a claim, they always brought a trunk with them. Write of that long journey to our state.

2. When a homesteader prepared for a move to North Dakota, decisions had to be made. What needed to be packed in the trunk? Describe some items that you would have put in your trunk for your new home in North Dakota.

3. You are lucky enough to visit a farm and find an old trunk in the farmhouse attic. Open it up and tell about the interesting memories tucked away just waiting for someone to discover or the history of each item found in the trunk.

4. You have just bid on and purchased an antique trunk. Now take it home and fill it with 10 of your favorite possessions. Tell us what they are and why you chose to put them into the trunk.

5. What if you found a trunk that was dated 3000? What types of items would the farms of the future need? Make a picture dictionary of these miracles of the agricultural future.

6. Make an analogy between a trunk full of treasures and the natural farm resources of North Dakota. How are these resources a never-ending treasure to our state?

7. Some treasures can't be touched or held in your hand; they are sights and sounds of the farm...Like the sound of a rooster's crow or a burst of sunlight over the fields. If you could capture some of these sights and sounds, which ones would you put in your trunk?

8. You have been given the job of selecting the most important item in agriculture to be put in a trunk. You can only select one thing. Tell what it would be and defend your reasons for choosing it.

BEST COPY AVAILABLE

"QUILTING BEE"
PATCHWORK QUILTS
(Art activity)

SUPPLIES:

10" construction paper squares
wallpaper sample books
glue
ruler
scissors

INTRODUCTION:

Homesteading meant constant hard work and little time for play. Neighbors were often miles away but people found excuses for getting together, enjoying each other's company and still getting the work done. One such way was the quilting party or "bee."

The first American quilts were patch work--patches of fabric sewn together to form one large piece.

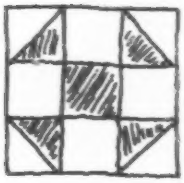
American pioneer women treasured these techniques because they provided a way of using fabric that was too expensive and too pretty to be used only once.

An album quilt was sometimes made as a gift for a bride or a special person. Each person made one block of the quilt and then embroidered her name on it. The blocks were then assembled into a quilt at a quilting bee.

In this exercise students will create an album quilt.

PROCEDURE:

1. Students should research various traditional quilting patterns such as; school house, lone star or double wedding ring. Discuss how these patterns developed.



shoofly

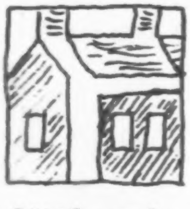
2. Each student should select or design a pattern for their block.

3. Using wallpaper samples, create the pattern on the construction paper block. Glue the wallpaper in place and sign the square.

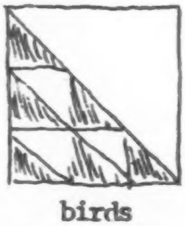
4. Hold a class quilting bee and assemble all the blocks into an album quilt on the classroom bulletin board or wall.

ANOTHER IDEA:

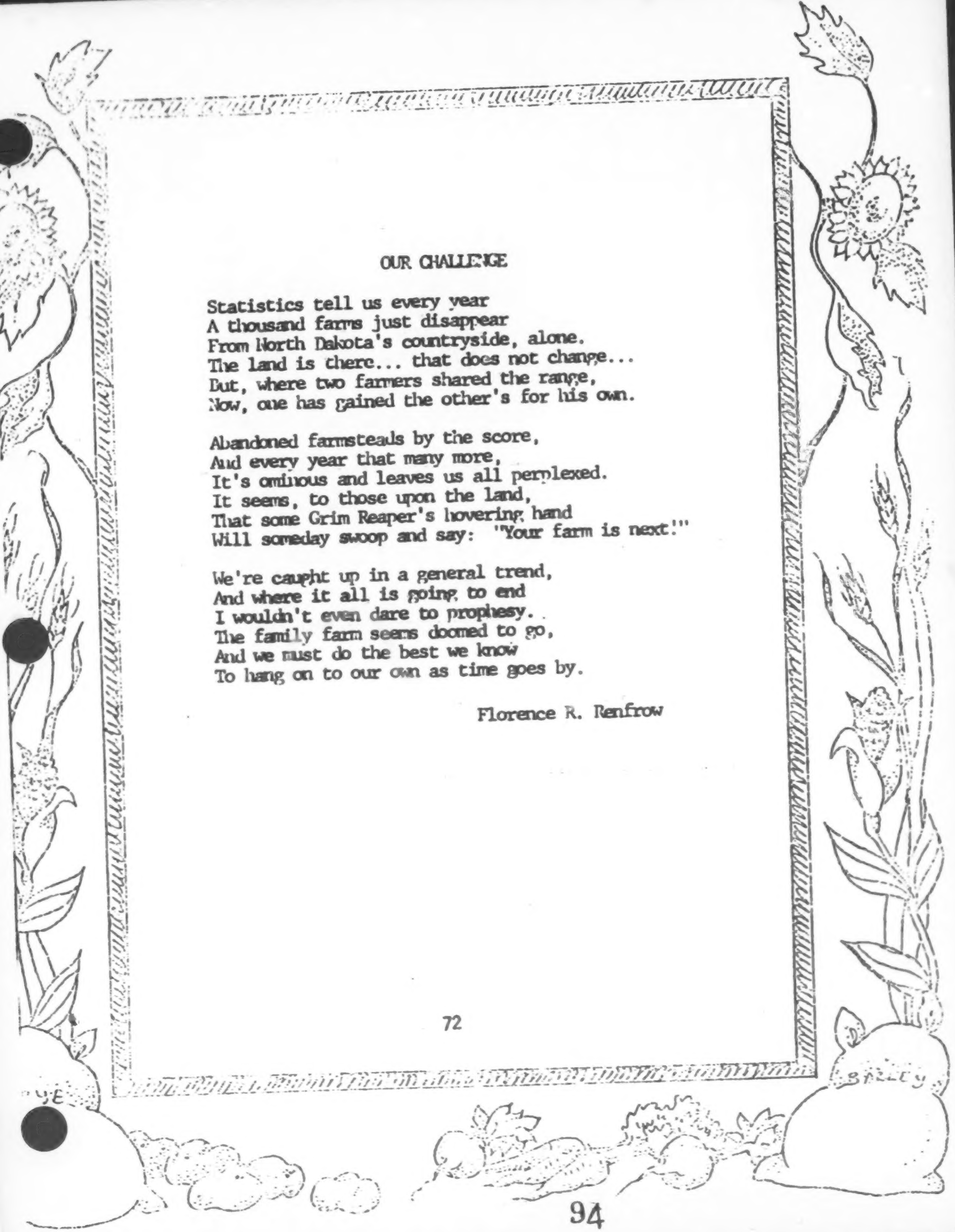
Make the quilt blocks from fabric and create a real quilt! Select a motif for the quilt such as; farm animals, prairie plants, country living, etc.



little red schoolhouse



birds in the air



OUR CHALLENGE

Statistics tell us every year
A thousand farms just disappear
From North Dakota's countryside, alone.
The land is there... that does not change...
But, where two farmers shared the range,
Now, one has gained the other's for his own.

Abandoned farmsteads by the score,
And every year that many more,
It's ominous and leaves us all perplexed.
It seems, to those upon the land,
That some Grim Reaper's hovering hand
Will someday swoop and say: "Your farm is next!"

We're caught up in a general trend,
And where it all is going to end
I wouldn't even dare to prophesy.
The family farm seems doomed to go,
And we must do the best we know
To hang on to our own as time goes by.

Florence R. Renfrow

WHEAT

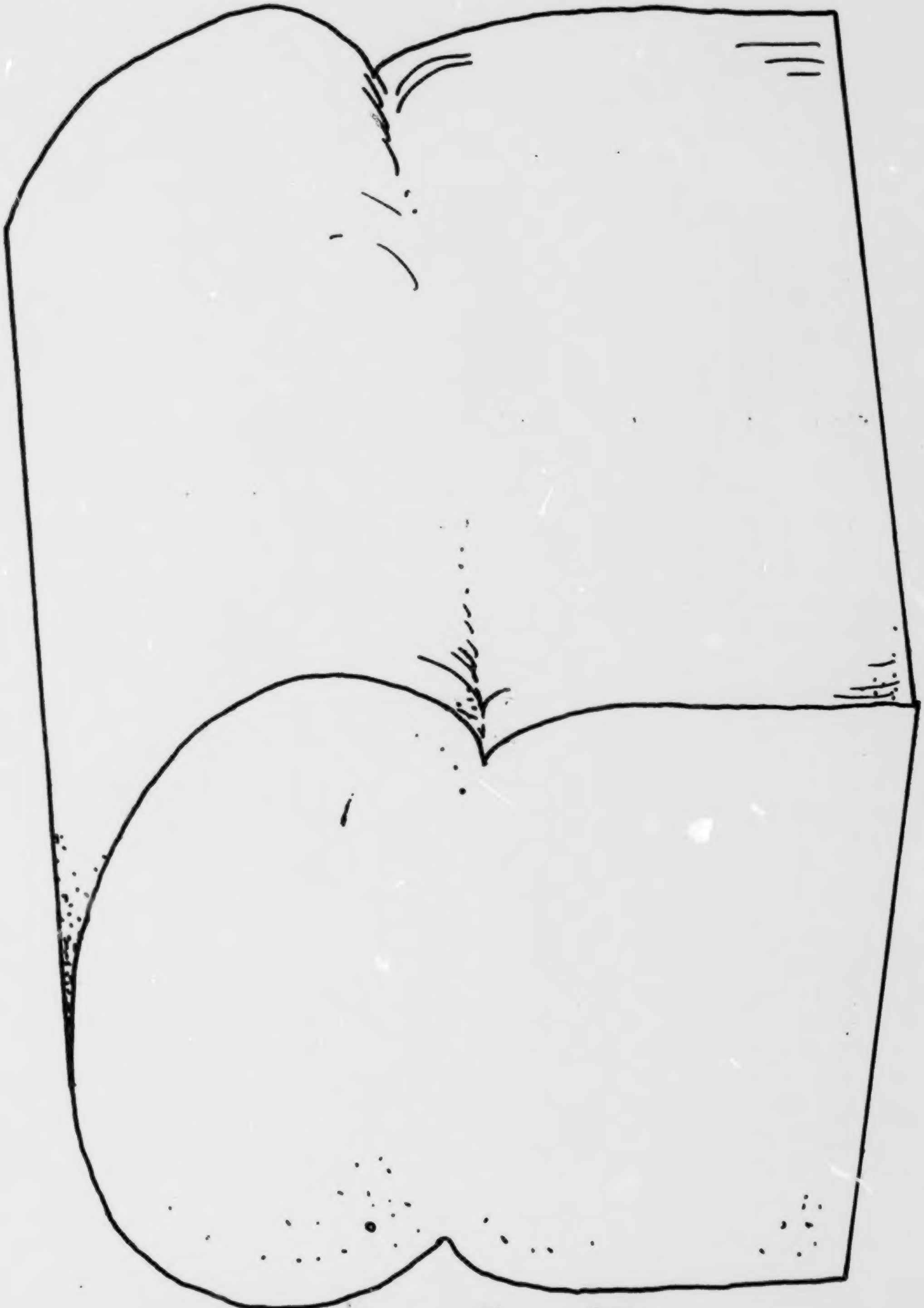
COMBINE	DURUM, WHITE, HARD RED WINTER, HARD RED SPRING, SOFT RED WINTER	RIBOFLAVIN	CERES	BREADBASKET OF AMERICA
SECOND	PROTEIN	GLUTEN	NIACIN	BUSHEL
IRON	ENDOSPERM BRAN GERM	GREAT PLAINS REGION	KERNELS	HARD RED SPRING WHEAT
SEMOLINA	THIAMIN	DURUM	RUST AND HAIL	COMPLEX CARBOHYDRATES

WHEAT
(Definition Cards)

Machine used to harvest wheat	Five classes of wheat grown	Destroyed when exposed to light	The word "cereal" comes from the name of this goddess	North Dakota and other wheat-producing states
N.D.'s ranking in overall U.S. wheat production	Made up of Amino acids	Protein which gives structure & elasticity to dough	A B Vitamin needed for proper functioning of the nervous system	Sixty pounds of hard wheat
Helps form hemoglobin	Three main sections of a kernel	Flat lands between the Rocky Mount. and 100° E. meridian	Part of wheat used to make flour products	N.D. is the largest producer of this wheat
Made from durum wheat used in making pasta or macaroni	A deficiency causes beriberi	Kind of wheat grown for pasta	Harmful enemies of wheat	Best source of energy for athletes

/

WHEAT TASK CARD



WHEAT
STAFF OF LIFE

1. At one time in North Dakota, durum was raised mainly in the northeast and north central parts of the state. This area was known as the "Durum Triangle." Today the "Durum Triangle" has expanded beyond its traditional boundaries. Find out where durum is grown in North Dakota today.

2. "Threshing rings" were often formed by local farmers when the first threshing machines came out. Research and find out why these groups were started in the early days.

   (Machines were expensive so the threshing rings owned just one which was used by each member of the ring to thresh the grain fields).

3. North Dakota, along with several other states, is called the "Breadbasket of America." It was once called "the great American desert." How did North Dakota change from a desert to a breadbasket? What ways did machines and science help make it possible?

4. The word cereal comes from the name of the Roman goddess, Ceres. Locate the story of Ceres and find out why cereal was named after this goddess. What was the Greek name for this goddess?

   (Demeter)

5. "The whole world is a wheat farmer's market." What makes wheat such an important food around the world?

6. Kernels of wheat are storehouses of nutrients. Whole kernels or parts of kernels are used to make different kinds of flour products. Look up wheat in the encyclopedia and find a drawing of a kernel. Make a sketch of the three main sections of a kernel of wheat and label the parts.

   (Endosperm, bran, germ)

7. Wheat products provide generous amounts of 1) protein, 2) carbohydrates, 3) iron, 4) thiamin, 5) niacin, and 6) riboflavin. Find out how these nutrients help keep our bodies healthy.

   (Protein--amino acids; carbohydrates--energy; iron--helps form hemoglobin; thiamin and niacin--aids appetite, digestion, and nerves; riboflavin--growth and good vision).

8. North Dakota ranks number one in the nation for the production of hard red spring and durum wheat. Read about wheat. Find out the names of the five classes of wheat grown throughout the United States.

   (White, hard red spring, hard red winter, soft red winter and durum)

9. Wheat fits into a class according to three things: 1) hardness of the kernels; 2) the color of the kernels, and 3) the planting time. What are the three qualities of durum and hard red spring wheat that make them well suited to growing in North Dakota?

   (1--hard kernels that protect against insects, 2--durum-amber and hard red spring wheat-red, 3--adapted to short growing season)

10. What could wars and wheat have in common? "The first word in war is spoken by guns but the last word has always been spoken by bread," such goes the quote by former President Herbert Hoover in 1934 when serving as chief of American Relief Administration after World War I. What do you think President Hoover meant by this statement? How could food have influenced the end of WWI?

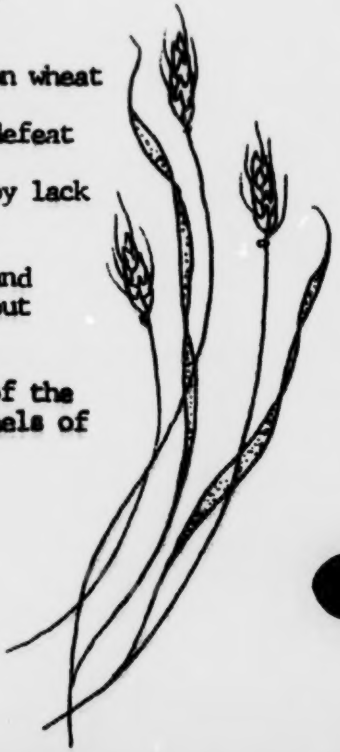
    (The Americans supplied the food that helped the Allies defeat Germany).

11. Research the following wars and find out what connection wheat had to their outcome:
    1) Civil War 2) World War II 3) Napoleon's defeat

    (1--victory of bread over cotton; 2--defeat of Hitler by lack of food; 3--troops lacked food)

12. Wheat can be attacked by many enemies such as disease and insects. One very harmful enemy is wheat rust. Find out what harmful effects this disease has on the plant.

    (Attacks the plant after the head appears, using most of the plant's food and water supply, thus drying up the kernels of wheat)



13. Smut is another very destructive disease that attacks wheat kernels. How does the disease affect the plant and what can be done to prevent smut from spreading to other wheat plants?

(Inside, the kernel fills with smut; can infect the other plants during threshing. Treatment of the soil before planting is best).

14. In 1970, Norman E. Borlaug, an American agricultural scientist was awarded the Nobel peace prize for his wheat research that led to the development of high-yield varieties. Because of these varieties wheat production greatly increased in underdeveloped countries such as India, Pakistan, the Philippines and Thailand. The worldwide effort to increase wheat production in these countries and others like them is sometimes called the Green Revolution. Read more about Norman Borlaug and the Green Revolution.

15. Every month of the year, wheat is being harvested somewhere in the world. What month or months does North Dakota harvest most of its wheat crops? Speculate what areas of the world would be harvesting wheat in January, February, etc.

16. A brief history of the North Dakota Mill:

In 1922, the State Mill and Elevator was constructed in Grand Forks. Since that time it has come to be called, "The North Dakota Mill" and has grown to be one of the largest, most modern plants in the United States!

There were difficult years when there was much debate about whether the mill should be sold or modernized. Then fate had a hand in the decision. In 1970, fire destroyed the mill so it was rebuilt, but with many improvements.

Many mills around the world produce average flour with the cheapest wheat possible. Flour made from hard red spring wheat is of a much higher quality than other cheaper flours. Flour produced by NDM is high in protein. The higher the protein, the stronger the gluten. Gluten is what gives bread better volume and texture. For many years North Dakota was the only mill producing high protein flour for home bread bakers to use.

A majority of the NDM milling business consists of turning durum wheat into semolina. There are six major semolina millers in the United States and North Dakota is one of them. Our mill does about one-sixth of the semolina market business. High quality semolina makes pasta that cooks well, stays firm, and resists overcooking.

Research more about the North Dakota Mill and its interesting past.

FOR AMBER WAVES OF GRAIN

Wheat, the most important of the cereal grains, provides more nourishment for nations of the world than any other food.

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "For Amber Waves of Grain."
2. You may not use proper nouns such as BERNIE.
3. Plurals are allowed.
4. Each letter can be used only once. For example: RARE is okay but GINGER is not because of the two g's.

*There are over 200 words! How many can you find?

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
10. ____________________
11. ____________________
12. ____________________
13. ____________________
14. ____________________
15. ____________________
16. ____________________
17. ____________________
18. ____________________
19. ____________________
20. ____________________
21. ____________________
22. ____________________
23. ____________________
24. ____________________
25. ____________________
26. ____________________

SUGGESTED ANSWERS FOR "FOR AMBER WAVES OF GRAIN" WORD HUNT

age(s)
aim(s)
amen
among
anger(s)
answer
are
arm(s)
armor
awe
awesome

bag(s)
ban(s)
bar(s)
barge(s)
beware
big
bin(s)
boar(s)
bog(s)
bone(s)
bore(s)
born
bovine
bow(s)
brag
braise
brave(s)
braver
brim
bring(s)

ear(s)
ease
even
ever

fair(s)
fame
famine
fan(s)
far
fare(s)
farm(s)
farming
favor(s)
fawn(s)
fear(s)
fever
few
fiber(s)
fig(s)
fine(s)
five
foam
foe(s)
fog
for
fore
foreign
forgive(s)
forgiven
frog(s)

game(s)
gave
gear(s)
gin
give(s)
given
gone
grab(s)
grave(s)
graven
grease
grief
grieve(s)
grim
grime
grin

infer

main
man
mange
manage
mar(s)
mare(s)
men
mine(s)
miner(s)
minor(s)
more
morn
move(s)
mover(s)
mow(s)
mower(s)

nab(s)
nag(s)
name(s)
nor
norms
now

oaf
obese
offer(s)
ogre
omen
ore
oven
over
owe(s)
own(s)
owner

ram(s)
ran
raw
ream(s)
rig(s)
roam(s)
roan
rove
row(s)

safe
safer
sag
saga
sage
save
savor
saw
see
sever
sew
sewer
sewn
soar
sob
some
soon
sore
sow
sower
sown

vain
van(s)
vane
vase
verse

wag(s)
wage(s)
warm

THE STAFF OF LIFE

Bread is often called "The Staff of Life," conveying the sense of man's dependence upon it.

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "The Staff of Life."
2. You may not use proper nouns such as LEIF.
3. Plurals are allowed.
4. Each letter can be used only once. For example; STIFF is okay but HILL is not because of the two l's.

*There are over 100 words! How many can you find?

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
10. ____________________
11. ____________________
12. ____________________
13. ____________________
14. ____________________
15. ____________________
16. ____________________
17. ____________________
18. ____________________
19. ____________________
20. ____________________
21. ____________________
22. ____________________
23. ____________________
24. ____________________
25. ____________________
26. ____________________
27. ____________________
28. ____________________
29. ____________________
30. ____________________
31. ____________________
32. ____________________
33. ____________________
34. ____________________
35. ____________________
36. ____________________

SUGGESTED ANSWERS FOR "THE STAFF OF LIFE" WORD HUNT

ail(s)
aisle
ale
also
ash
ate

ease
easel
east
eat(s)
eel
elf
else

faith
fast
fat
fate
feast
feat(s)
feel(s)
fees
feet
file(s)
fish
fist
flash
foil

hail
haste
hat(s)
hilt
his
hit
hose
host
hot
hotel

isle

lash
last
late
lathe
leaf
least
lest
lift(s)
list
lit
loaf
loathe
loft(s)
lose
lost
lot(s)

oaf
oats
off
oil

safe
seal
sift
silo
soft
soil
staff
steal
steel
stiff

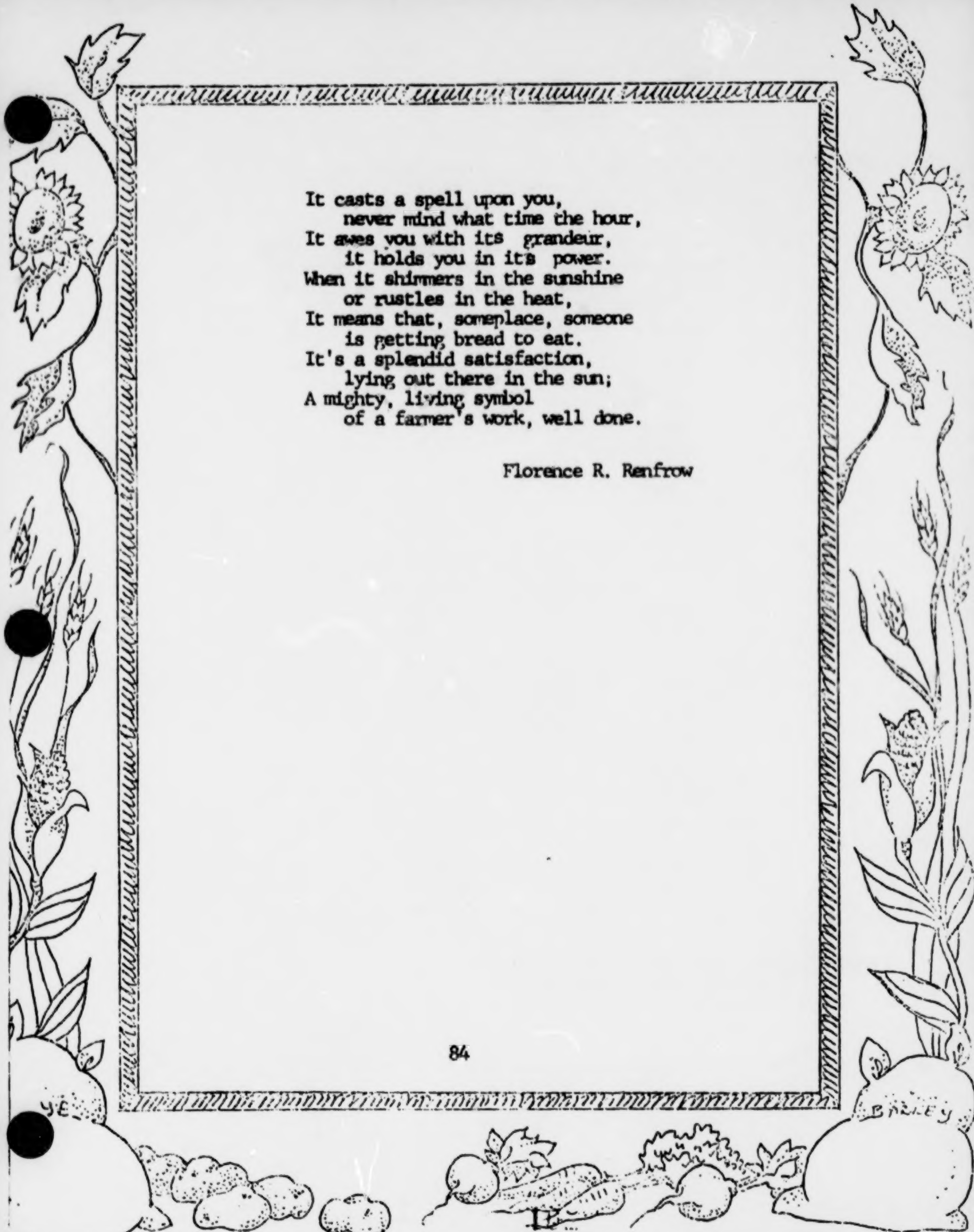
tail(s)
tale(s)
taste
teal
tease
test
ties
tiff
tile(s)
tilt(s)
that
theft
these
thief
this
thistle
toast
those
tot
total
tote(s)

WHEATFIELD

Do you see that mighty ocean,
lying out there in the sun?
There's no prettier sight recorded
since Creation was begun.
'Tisn't flat, as you'd expect it,
with breakers on the shore,
There's no ship upon its bosom,
there's no seabird flying o'er,
There's no salty breeze to savor,
fact, it isn't even wet,
But it surely is a beauty...
it's a sight you won't forget.

There are gentle little billows
that dip and race and run,
Going off to the horizon
in an ecstasy of fun.
There are hills and sloughs and hollows,
green and golden over all,
One vast expanse of motion,
standing almost thigh-bone tall.
See it dip and sway and curtsey,
see it bend and hear it sigh,
Many treasured golden acres
stretching out beneath the sky.

And if you want a picture,
you should see it in a storm.
Swaying gently in the breezes
while the purple masses form,
It becomes a tortured frenzy,
whipping madly, to and fro,
With the lightning cracking o'er it
and the thunder crashing low.
Every brittle straw in torment,
'til you'd think its time was done,
But there she'd be a-smiling,
come the shining of the sun.



It casts a spell upon you,
    never mind what time the hour,
It awes you with its grandeur,
    it holds you in it's power.
When it shimmers in the sunshine
    or rustles in the heat,
It means that, someplace, someone
    is getting bread to eat.
It's a splendid satisfaction,
    lying out there in the sun;
A mighty, living symbol
    of a farmer's work, well done.

Florence R. Renfrow

"THE GREAT PLAINS TEN"
(Map skills)

SUPPLIES: dittoed map entitled, "The Great Plains Ten"
answer key for "The Great Plains Ten"
atlas or large map of the United States

INTRODUCTION: The Great Plains area is the Breadbasket of the Nation and one of the greatest wheat producing areas in the world. This area can be located on a map of the United States by using the following definition:

> The Great Plains has the eastern boundary defined by the 100°E meridian and a western boundary being the foothills of the Rocky Mountains.

PROCEDURE:

1. Pass out the maps entitled, "The Great Plains Ten"
2. After reviewing the definition of the Great Plains area, have the students try to locate the 10 states which are members of the Great Plains.
3. Allow each child individual time to lightly X the states which they think are part of the "Great Plains Ten."
4. Distribute the answer key. Have the students cut out the darkened section on the United States map. Now use this as an overlay. Line it up exactly with the Rio Grande River on the southern border of the U.S.
5. Trace around the pattern on your map.
6. Together, or individually, label the 10 states that belong to the "Great Plains Ten."
7. Students should then color their map and make a map key distinguishing the Great Plains region from the rest of the United States.

NOTE: The 10 Great Plains states are:

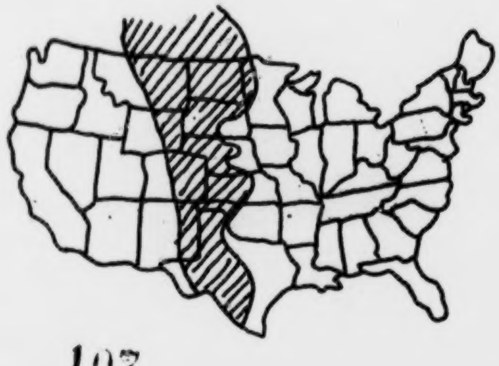
North Dakota
South Dakota
New Mexico

Montana
Colorado
Oklahoma
Wyoming

Kansas
Nebraska
Texas

ANOTHER IDEA: Challenge your students to name the three Canadian provinces also in the Great Plains region.

(Manitoba, Saskatchewan, Alberta)



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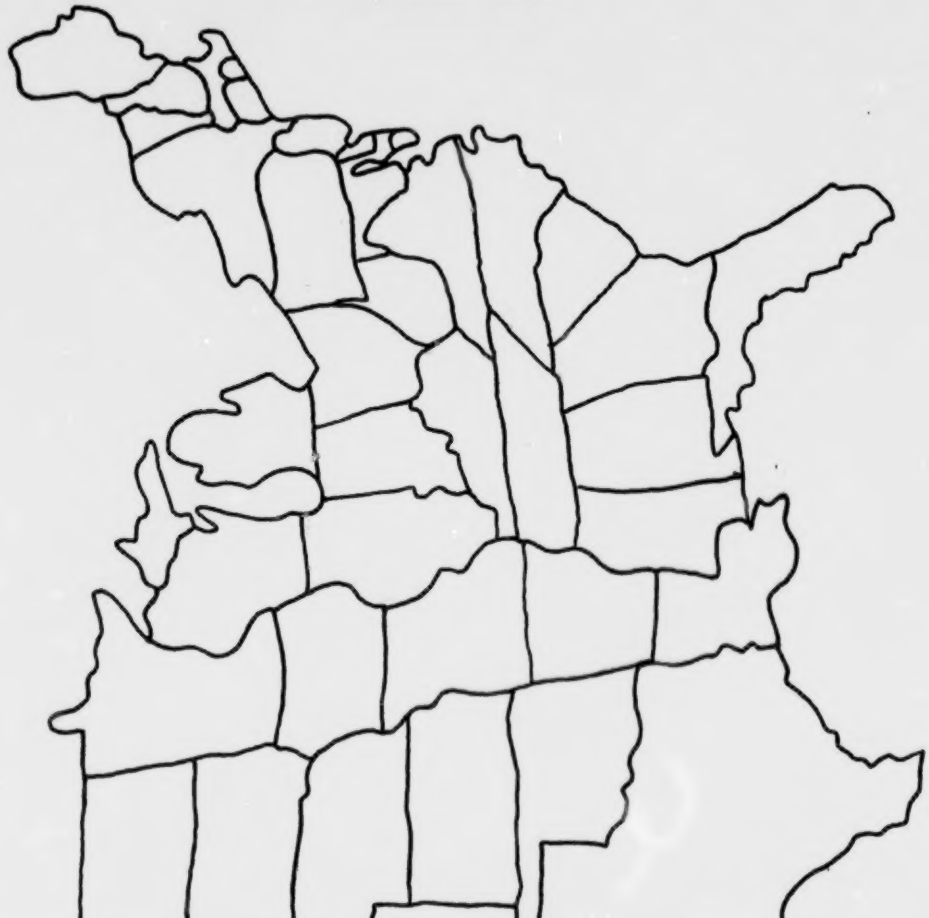
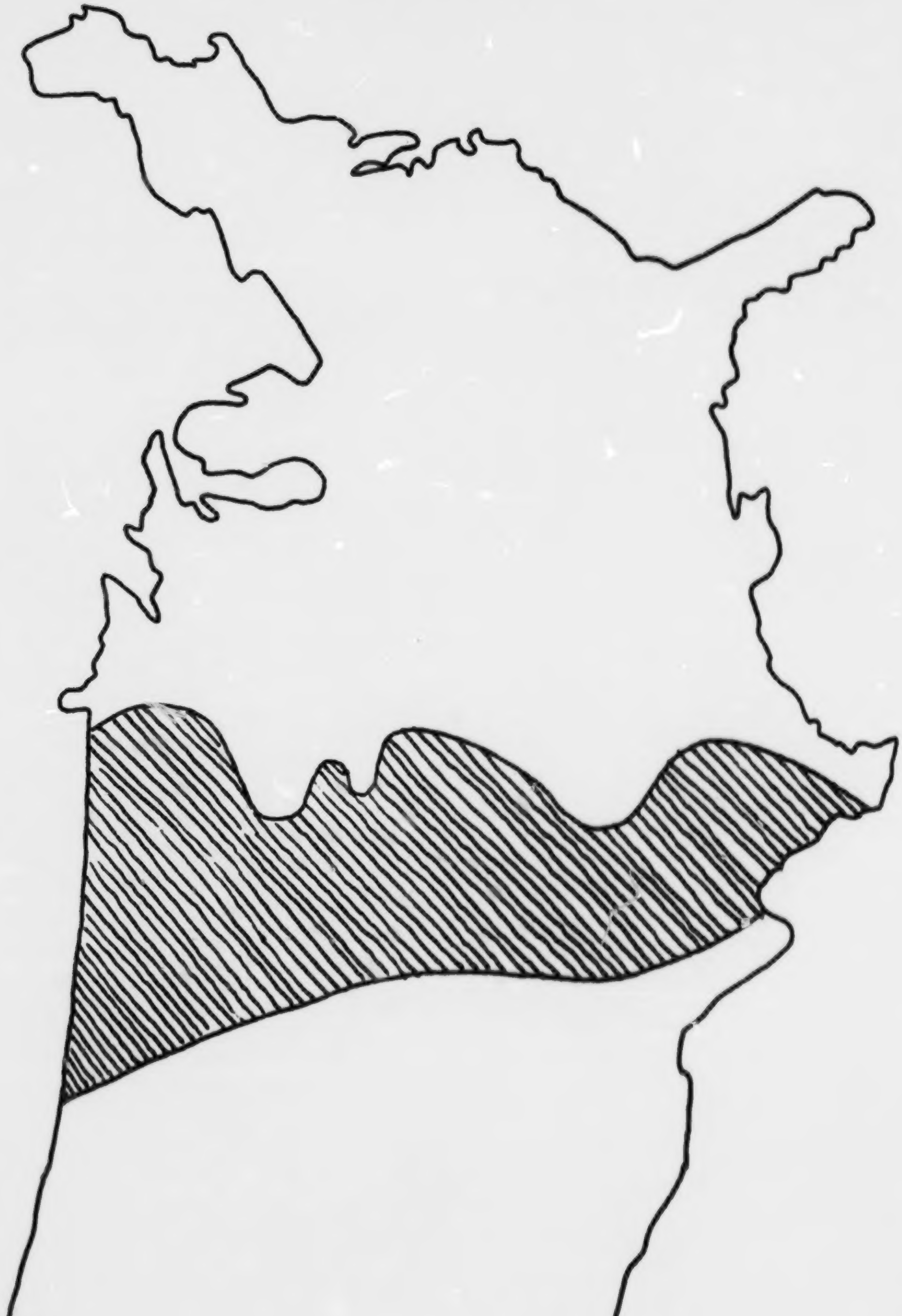
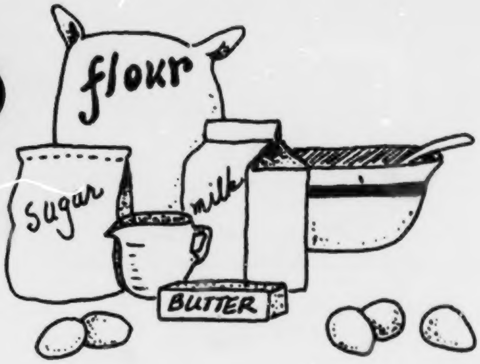
THE GREAT PLAINS TEN

(Student Map)



GREAT PLAINS TEN
(Answer Key)





WHICH WHEAT WHERE?
(Matching activity)

The next time you go grocery shopping, notice the variety of flours available in the stores. Wheat flour is a very important ingredient in home baking, pasta and baked products. Different kinds of wheat are milled into flour for a variety of products. Match the names of the wheat flours with their special characteristics and uses.

WHEAT FLOURS

____ 1. Self-rising flour
____ 2. Cake flour
____ 3. Gluten flour
____ 4. All purpose flour
____ 5. Pastry flour
____ 6. Bread flour
____ 7. Semolina
____ 8. Stone ground flour
____ 9. Graham flour
____10. Whole wheat flour
____11. Durum flour

CHARACTERISTICS AND USES OF WHEAT FLOUR

A. Contains the whole kernel, bran, germ, and endosperm
B. Milled from a soft, low gluten wheat for pastries
C. A by-product in the making of semolina, used to make noodles
D. All purpose flour with salt and leavening added
E. A type of whole wheat flour used to make crackers
F. Milled from soft wheat to make cakes and cookies
G. Whole wheat flour coarsely ground by stone
H. Used by bakers with other flours to make high protein gluten bread
I. Coarsely ground endosperm of durum wheat used to make pasta products
J. A combination of soft and hard wheats for a wide variety of uses by home bakers
K. Milled mostly for bakers for baking yeast breads

COOK UP A STORM

Make a picture book entitled, "Which Wheat Where?" Place the name of each wheat flour on a page and illustrate items that can be made from the flour. Make it colorful and mouthwatering!

(Answers found on page 263)

GREAT PLAINS REGION

Ten states make up the greatest wheat growing area of the world.

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "Great Plains Region."
2. You may not use proper nouns such as GENE.
3. Plurals are allowed.
4. Each letter can be used only once. For example; EAGER is okay but PAPER is not because of the two p's.

*There are over 300 words! How many can you find?

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
8. ________________
9. ________________
10. ________________
11. ________________
12. ________________
13. ________________
14. ________________
15. ________________
16. ________________
17. ________________
18. ________________
19. ________________
20. ________________
21. ________________
22. ________________
23. ________________
24. ________________
25. ________________
26. ________________
27. ________________
28. ________________
29. ________________
30. ________________

SUGGESTED ANSWERS FOR "GREAT PLAINS REGION" WORD HUNT

again
age
agile
aging
ailing
airplane(s)
algae
align
alien
alone
alpine
anger
angle(s)
angler(s)
ant(s)
apron(s)
ate

ear(s)
earl
earn(s)
east
elite
elongate
engine
earnest

gain(s)
gale(s)
gasp
gear(s)
get(s)
girl(s)
glean(s)
glisten
going
gone
got
grant(s)
grape(s)
grasp
grate(s)
grease
greet(s)
grin(s)
grip(s)
gripe(s)
grist
groan(s)
grope(s)

ignite(s)
inn(s)
insane
integer(s)
into
isle

lag(s)
lane(s)
lap
last
late
leap(s)
learn
lease
least
leg(s)
lest
let
line(s)
lion(s)
list
listen
log(s)
loin(s)
lone
lope(s)
lore
lose
loser
lost

nag(s)
nail(s)
nap(s)
near
neat
nest
net(s)
nine
none
nose
not

oil
opal
open(s)
opera(s)
operate(s)
ore

organ(s)
origin(s)
original(s)
originate(s)

page(s)
pail(s)
pain
paint(s)
pair(s)
pal(s)
pale(s)
pan(s)
pane(s)
panel(s)
pangs
pant(s)
past
paste
pat(s)
parole
patrol(s)
pear(s)
pearl(s)
pen(s)
pent
pest
pester
pet(s)
pin
pine(s)
pint(s)
plan(s)
plane(s)
point(s)
poise
pores
pose
post
pot(s)
praise
print(s)
pro(s)
prone

rag(s)
rage(s)
rail(s)
rain(s)
ran

rat(s)
rate(s)
real
reap(s)
reaper
rear(s)
regain
regal
rest
rig(s)
rinse
rip(s)
ripe
ripen
roan
roar(s)
role(s)
rope(s)
rose
roster
rot(s)

sag
sage
sail
sailing
saline
salon
salt
saltine
sane
sang
sap
sat
sea
seat
see
seen
seep
sin
sing
soap
soil
son
song
sore
steep
stripe

tag(s)

tail(s)
tale(s)
talons
tan(s)
tap(s)
tape(s)
tar
tarp(s)
tea
tear(s)
tease
teen(s)
ten
tense
tin
tip(s)
toes
toil(s)
ton(s)
tone(s)
top(s)
tore
trip(s)

A CINQUAIN HARVEST OF WHEAT
(Language Arts activity)

SUPPLIES: An ample supply of 2" X 2" squares of tissue paper in earthy, autumn colors,
4" X 4" squares of construction paper in autumn colors,
several shafts of wheat,
9" X 10" cardboard or heavy tagboard,
markers,
brushes,
glue

INTRODUCTION:

Harvest is a beautiful time of the year in North Dakota. The fields are full of lush ripe crops waiting to be harvested. Poetry is one way to capture the beauty and preserve it in words.

PROCEDURE:

1. Cinquain poetry is a good way to express beauty in nature. Introduce the cinquain form to the students:

Line one: One word to give the title
Line two: Two words describing the title
Line three: Three action words about the title
Line four: Four words that express feelings about the title
Line five: One word that renames the title

2. Pass out four or five shafts of wheat for each student to look at. They might make a word bank first, filled with descriptive words that are needed in the poem. For example:

WHEAT

COLOR	FEELINGS	ACTION	OTHER NAMES
golden	warmth	waving	wheat
yellow	important	flowing	durum
amber	beautiful	swaying	grain

3. To help explain the activity, you may wish to do a poem first as a group and then allow each student time to write their own cinquain poem.

4. Proofread and correct spelling mistakes, etc.

5. Copy the final product on a piece of colored construction paper in pencil. Go over the poem in marker once the student is sure everything is correct.

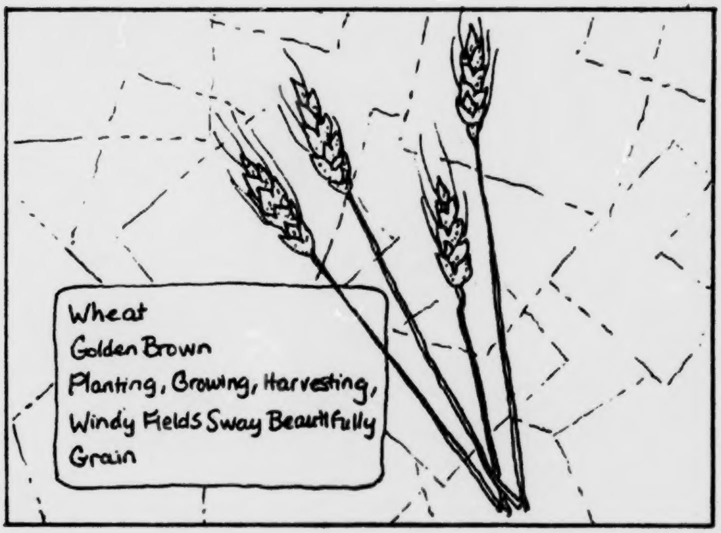
A CINQUAIN HARVEST OF WHEAT continued

6. Prepare the cardboard by covering it with the tissue squares:

Mix ½ glue to ½ water. Brush the mixture on to a section of the cardboard. Place a piece of tissue paper on the wet area. Brush over the tissue with the glue mixture. Move to the next section and continue the process until the entire board is covered. Be sure the students overlap the pieces and use a variety of colors to create an autumn look.

7. Position and glue down the poem on one side.

8. Position and glue down on the board, four or five shafts of wheat trimming off the ends of the shafts to fit the board.



ANOTHER IDEA: 1. Why limit yourself to just wheat? Collect bundles of other grains harvested in North Dakota and write about them.

2. Cinquain is just one form of poetry. Your class may wish to use something else as the format for this poetry lesson. Go ahead!

BEST COPY AVAILABLE

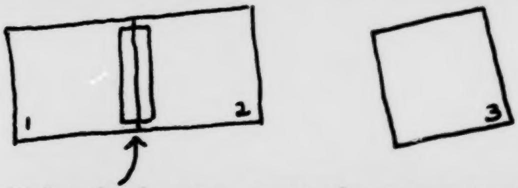
WHEAT: FOOD SINCE ANTIQUITY
(Historical research-art lesson)

SUPPLIES: Time Line ditto, book tape, 9 x 12 or larger tagboard, markers or crayons

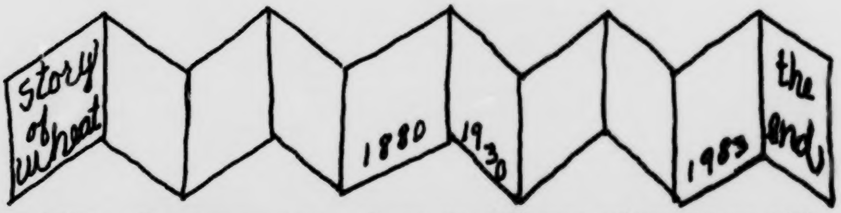
INTRODUCTION: Wheat as an important food crop cannot be understated. Likewise is the importance of wheat in the story of man. Cultivated wheat is closely linked with the development of civilization itself.

PROCEDURE:

1. Using the Historical Time Line of Wheat Cultivation, create an accordian fold display book illustrating these important events in the Story of Wheat.
2. Have each student select one of the time line events.
3. On the tagboard, have the students illustrate their event.
4. Arrange the pages in order and number them.



5. Using book tape, tape the pages together.
6. Fold accordian style and display.

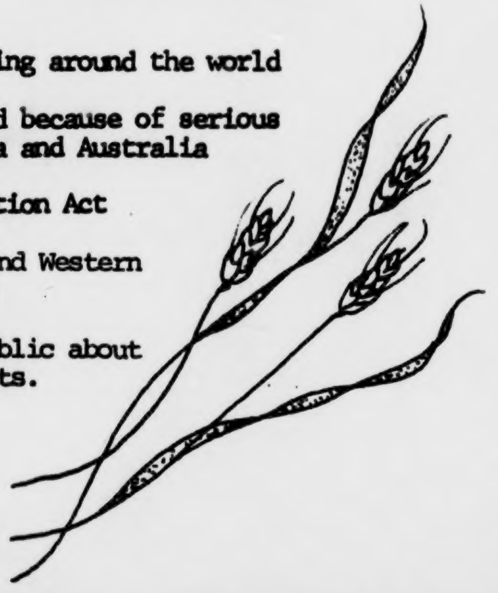


ANOTHER IDEA: Encourage your class to add any other dates which tell the story of wheat both in the world and also in our state. For example:

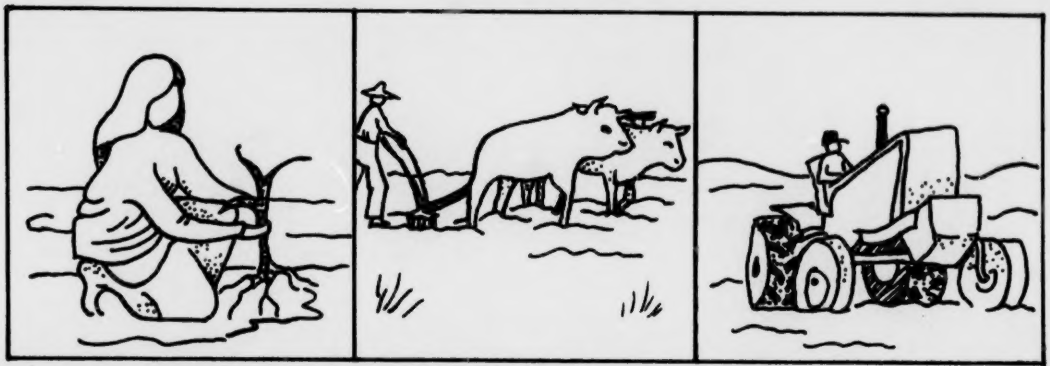
1. Homesteaders growing wheat
2. Establishment of the State Mill and Elevator at Grand Forks
3. Landmarks in railroad development
4. Current standing in wheat production
5. New uses of wheat by-products

WHEAT "CULTIVATION":
A Historical Time Line

?	Cultivation began sometime during the Mesolithic Period (Middle Stone Age)
5000 BC	Wheat was grown in the river valleys of the Tigris, Euphrates and Nile Rivers.
4000 BC	Cultivation of wheat in Indus River area
2500 BC	Wheat grown in China (one of 5 sacred grains planted by the ancient Chinese to honor their dead)
2000 BC	British Isles evidences use of wheat
AD 1493	Columbus introduces wheat to the New World
AD 1519	Spanish explorer, Cortez brings wheat to Mexico. Introduced to North America by missionaries
1602	Bartholomew Gosnold planted wheat at Buzzards Bay, Massachusetts
1618	Wheat grown at Jamestown, Virginia
1800	Pioneers of western New York and the Ohio Valley had been successfully planting wheat for a number of years
1860	Indiana and Illinois were the leading wheat-producing states
1873	Mennonite immigrants introduced wheat called "Turkey Red" to the states of Kansas and Oklahoma
1930-1970	Many farmers participated in federal price support programs
1954	Agricultural Trade Development and Assistance Act, PL 480
1959	Formation of N.D. Wheat Commission and Great Plains Wheat Incorporated
1970	Severe grain shortage began developing around the world
1972	World wheat supplies further reduced because of serious droughts in Russia, China, Argentina and Australia
1977	The Agriculture and Consumer Protection Act
1980	Merger between Great Plains Wheat and Western Wheat to form U.S. Wheat Associates
1984	Ag Foundation created to educate public about wheat and other agricultural products.



WHEAT : FOOD SINCE ANTIQUITY



One cannot study the history of mankind without realizing the massive importance and impact of wheat on the development of civilization itself!

__WORD HUNT DIRECTIONS__:

1. Find and write words of three or more letters from the words, "Wheat: Food Since Antiquity."
2. You may not use proper nouns such as NANCY.
3. Plurals are allowed.
4. Each letter may be used only once. For example: STOOD is okay but DEAD is not because of the two __d's__.

*There are over 300 words! How many can you find?

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
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11. ____________________
12. ____________________
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16. ____________________
17. ____________________
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20. ____________________
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23. ____________________
24. ____________________
25. ____________________
26. ____________________
27. ____________________
28. ____________________
29. ____________________
30. ____________________

SUGGESTED ANSWERS FOR "WHEAT: FOOD SINCE ANTIQUITY" WORD HUNT . . .

ace
acid
acquaint
acquisition
acquit(s)
act(s)
action(s)
annoy(s)
ant(s)
antique(s)
aqua
ash
ashen
aside
ate
aunt(s)
away
awe
awed

cafe(s)
cast
cat(s)
cent(s)
chase
chef
chest
chew
chide
chief
chin
choose
chose
cod
code(s)
coin(s)
con
cone(s)
condition(s)
confide
confound
cost
cot(s)
count(s)
cow(s)
coy
cud
cue(s)
cut(s)
cute
cutty
cyst
dance
date(s)
daunt(s)
daunted
dawn
day(s)
deaf
dense
dent(s)
deny
dew
diet(s)
dish
done
down
due(s)

east
easy
eat(s)
educate
education
end(s)
entice
equate(s)

fad(s)
fan(s)
fast
fat
fate
fawn
feat
feast
fed
feed
feet
fence
few
fin(s)
find
fish
fist
fit
found
fun
funny
fuse

had
hand(s)
haste
hat(s)
hate(s)
hay
head(s)
heat(s)
heed(s)
hen(s)
hence
hew
hewn
hide
hind
hint
hit(s)
honey
hound(s)

ice
inch
initiate
inn(s)
inside
instead
institute
institution
intend
into
intuition
itch

neat
nest
net(s)
new
nifty
nod(s)
non
none
nose
not
note(s)
notice
notify
noun(s)
now
nut(s)
nutty

one
once
osage
owe(s)
owed
own(s)
owned

quaint
queen(s)
quest
quiet
quinine
quit(s)
quite

safe
said
sag
sage
sand
sane
sat
sauce
say
scent
scone
seat
seen
sew
shade
sheet
shift
shin
shine
shone
shoo
shoot
shot
show
shut
shy
sin
sit
situate
situation
snide
snow
son
soot
sound
sow
soy
squad
squash
squaw
squid
squish
stand
stay
stone
stood
student
stun
stunt
sue
suede
sun
swan
swat
sway
sweat
sweet
swift

tan(s)
taste
test
thin
this
tie(s)
ton(s)
tone(s)
too
town(s)
tweet
twin(s)
twist

unify
unto
use
used

waist
wait(s)
wand(s)
want(s)
waste
way(s)
wed(s)
weed(s)
went
wet(s)
when
why
wide
win(s)
wince
wind(s)
wish
wit(s)
won
wound(s)

yawn
yes
yet
yew
you
youth

BREAD BASKET OF THE NATION

North Dakota is an important member of the Bread Basket area of the United States.

WORD HUNT DIRECTIONS:

1. Find and write words of three or more letters from the words, "Bread Basket of the Nation."
2. You may not use proper nouns such as FRED.
3. Plurals are allowed.
4. Each letter may be used only once. For example: BABE is okay but RARE is not because of the two r's.

*There are over 425 words! How many can you find?

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
10. ____________________
11. ____________________
12. ____________________
13. ____________________
14. ____________________
15. ____________________
16. ____________________
17. ____________________
18. ____________________
19. ____________________
20. ____________________
21. ____________________
22. ____________________
23. ____________________
24. ____________________
25. ____________________
26. ____________________
27. ____________________
28. ____________________
29. ____________________
30. ____________________

SUGGESTED ANSWERS FOR "BREAD BASKET OF THE NATION" WORD HUNT . . .

abandon
abate
abated
abide(s)
abode
abreast
adorn(s)
afar
afraid
aid(s)
aide(s)
and
another
ant(s)
anthem(s)
are
area(s)
ark(s)
art(s)
ask
aster
attire(s)

bad
bait(s)
baited
bare(s)
ban(s)
band
banned
banter(s)
bark(s)
bask
baste
bat(s)
bath
bathes
batter(s)
bead(s)
bear(s)
beast
beat(s)
beaten
beatened
bed(s)
beneath
best
bet(s)
bid(s)
boar(s)

boat(s)
bone(s)
bore(s)
bored
born
bother(s)
bothered
brad(s)
braid(s)
brain(s)
brake(s)
bran(s)
brand
brat(s)
bread(s)
break(s)
breast
breath
breathes
broke
broken
broth

dare(s)
dark
darken
dart(s)
dash
dasher
data
date(s)
dean
dear(s)
death
debt(s)
deer
dish
disk
done
door(s)
doth
drain(s)
drake(s)

ear(s)
earn(s)
east
eat(s)
eaten

either
entire

fad(s)
fade(s)
fake(s)
fan(s)
far
fare
fast
faster
fat(s)
fate
father(s)
fatten
fatter
fashion
fear(s)
feast
feather(s)
feat(s)
fed
feed
feet
ferns
fiend(s)
fin(s)
find
fir(s)
fire(s)
first
fish
fist
food
foot
for
fore
fort(s)
frank
freak(s)
free(s)
fresh
freshen
freed
fret(s)
fried
friend

had

hand(s)
hare(s)
hark(s)
haste
hasten
hat(s)
hate(s)
head(s)
hear(s)
heard
heart(s)
heat(s)
heated
heater
her(s)
hid
hide(s)
hire(s)
hired
hoarse
honest
honor(s)
horn(s)
horse
hot

inert
inn(s)
instead
into
irk(s)
iron(s)

kid(s)
kin
kit(s)
kitten(s)
knead(s)
knife
knot(s)

naked
near(s)
neat
neater
need(s)
neither
nest

net(s)
non
none
nor
north
not
note(s)
noted

oak
oaken
oar(s)
oats
obese
ode
often
one(s)
ore
ornate
otter(s)

rabid
rabies
raid(s)
rake(s)
ran
rash
rat(s)
rate(s)
rated
read(s)
red
reek(s)
reside
rest
retire(s)
rid(s)
ride(s)
rite(s)
rode
rook
roost
rot(s)
rotten

sad
said
sand

sake
sane
seat
seen
set
settee
setter
shade
shake
shear
shed
sheen
sheer
sheet
sheik
shin
shine
shirk
shirt
shod
shone
shook
shoot
shore
short
shot
side
sir
sire
soak
soar
sob
soft
soften
son
sore
sort
stab
stake
steak
stein
stir
stoke
stone
store
stork
streak
street
stride
strike
strode

SUGGESTED ANSWERS FOR "BREAD BASKET OF THE NATION" WORD HUNT continued

stroke

tab(s)
take
tan(s)
tar(s)
tare(s)
tarnish
tart(s)
task
taste
tasted
tear(s)
tease
teeth
tenor(s)
tent(s)
test
tested
tide(s)
tire(s)
tired
tithe(s)
toad
toast
token(s)
ton(s)
tone(s)
tooth
tore
torn
torsk
torte(s)
tot
trade(s)
train(s)
trash
tread(s)
treat(s)
trend(s)
treks
tribe(s)
tried
tries

"BROWN BAGGING IT"

(Descriptive research)

SUPPLIES: "Brown Bagging It" survey sheet

INTRODUCTION: How many wheat related products do you think you eat in one school lunch? How many in a week? Predict what the total would be for a month of school lunches.

PROCEDURE: 1. Tell the students they are going to make a survey of their own school lunch for the next 20 days.

2. Each day, individual students will chart their own lunch menu onto the survey sheet by checking the appropriate food groups for each item. These charts may vary, depending on how many "brown baggers" you have. Instruct the students to chart EVERYTHING that was offered to them whether they ate it or not.

3. Carefully go over with the students the four basic food groups so they understand under which food group all items should go.

GROUP 1 Breads and Cereals	GROUP 2 Milk and Milk Products	GROUP 3 Vegetables and Fruits	GROUP 4 Meat Group
4 or more servings daily Enriched whole grain or restored breads and cereals; other baked foods made with enriched or whole grain flour; enriched macaroni, spaghetti and noodles	to drink and in cooking Children; 2-3 cups Teenagers; 4 or more cups Adults; 2 or more cups Cheese and ice cream may replace part of the milk	4 or more servings daily Include a citrus fruit or tomato, a dark green or yellow vegetable, and other vegetables and fruits, including potatoes	2 or more servings daily Beef, veal, pork, lamb, fish, poultry, eggs...with dry beans, dry peas, nuts and peanut butter as alternated and for variety

4. Be sure to have the students check all appropriate boxes if a food item belongs in more than one group. For example:

Cherry pie belongs under "Vegetables and Fruits" as well as "Breads and Cereals"

"BROWN-BAGGING IT" CONTINUED

5. After completing the chart, have the students tabulate the columns. Rank the food groups according to the results.

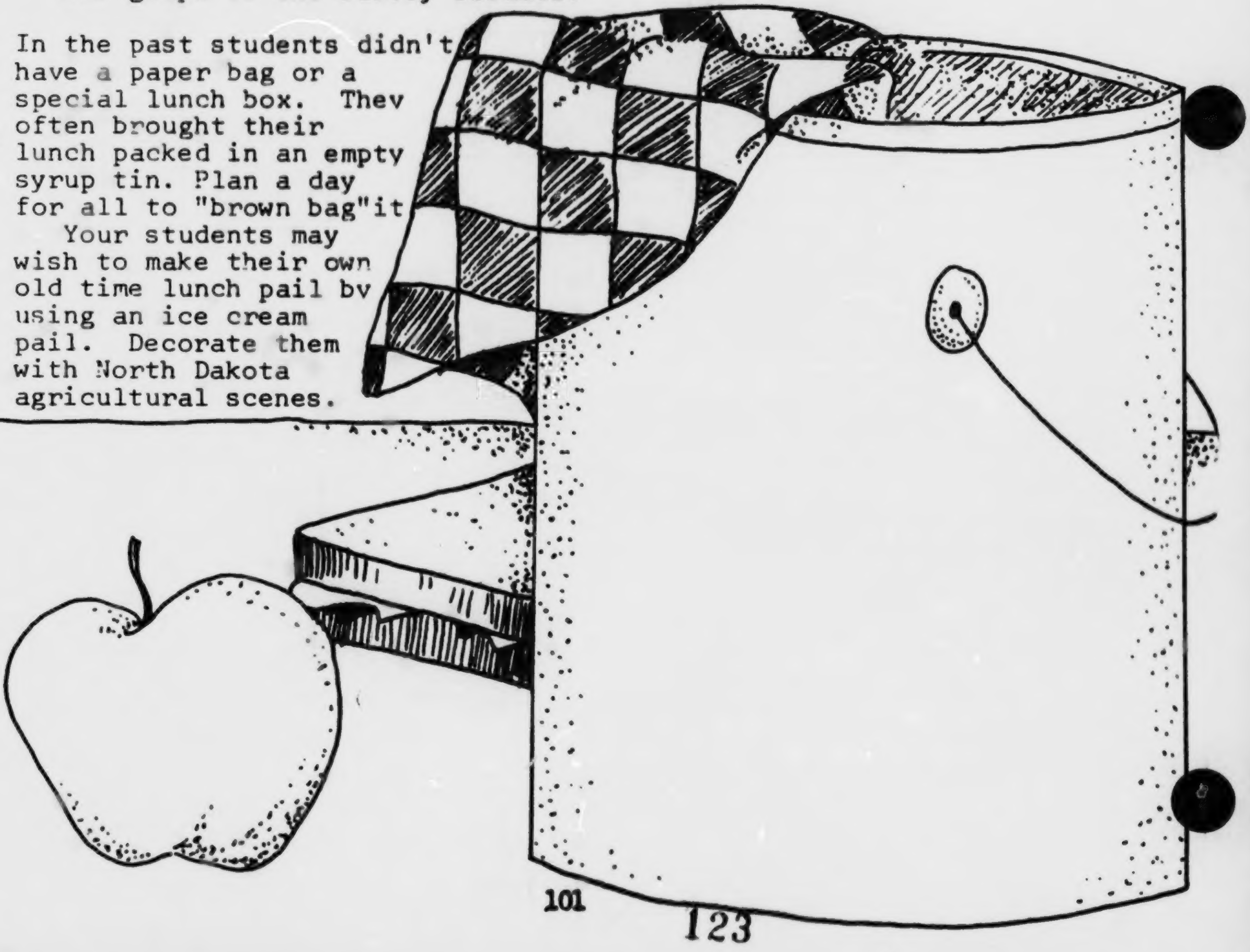
6. What conclusions can be drawn from the survey? How much do we depend on wheat and its by-products? Would you say wheat is a main staple in our life?

ANOTHER IDEA: The teacher may wish to now make a comparison of all the students' charts. This could be done by making an overhead of the survey and recording each child's totals.

***Depending on the age and level of math abilities, you may wish to find the percentage of each food group served for 20 days. Each student could show his/her results in a pie-shaped graph.

***Younger children may enjoy making a bar graph of the survey results.

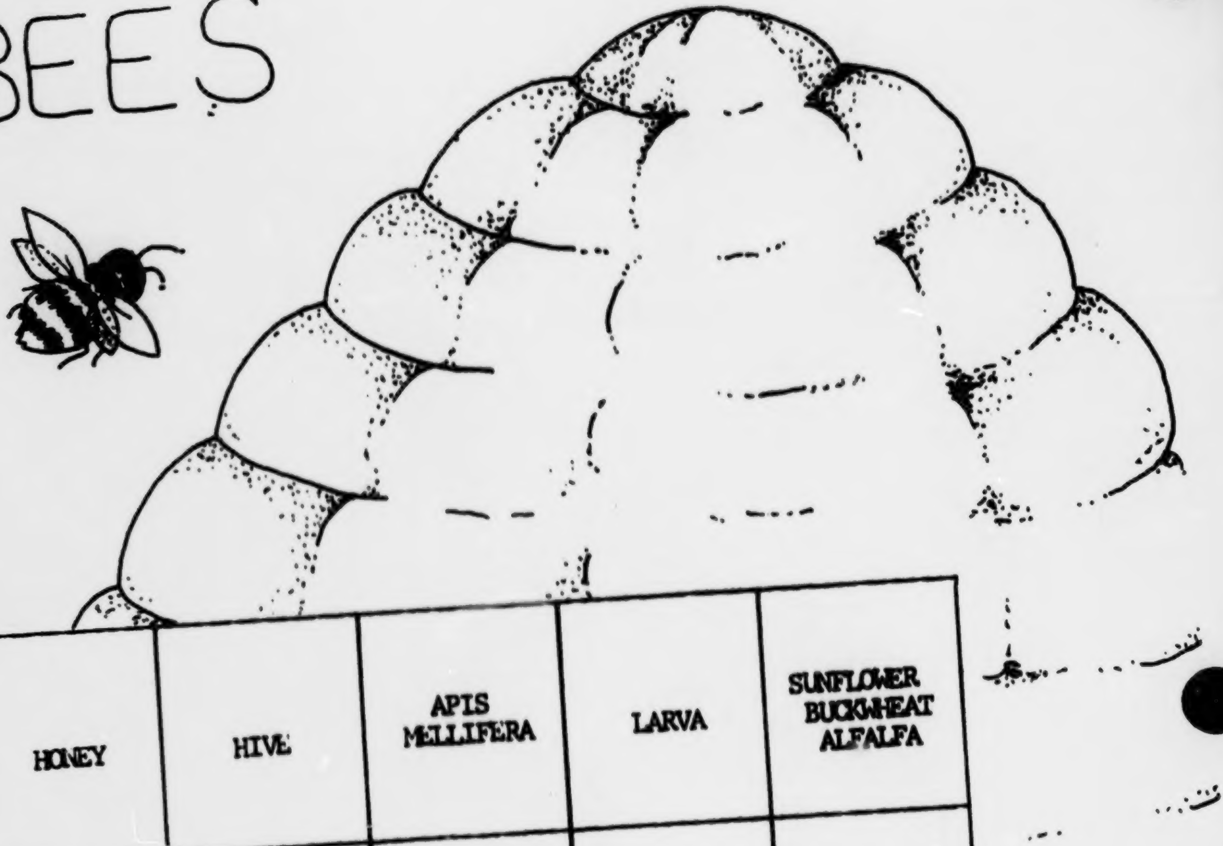
In the past students didn't have a paper bag or a special lunch box. They often brought their lunch packed in an empty syrup tin. Plan a day for all to "brown bag"it. Your students may wish to make their own old time lunch pail by using an ice cream pail. Decorate them with North Dakota agricultural scenes.



"BROWN-BAGGING IT" SURVEY

DATE	BREADS AND CEREALS	MILK AND MILK PRODUCTS	VEGETABLES & FRUITS	MEAT GROUPS	DAILY TOTALS

BEES

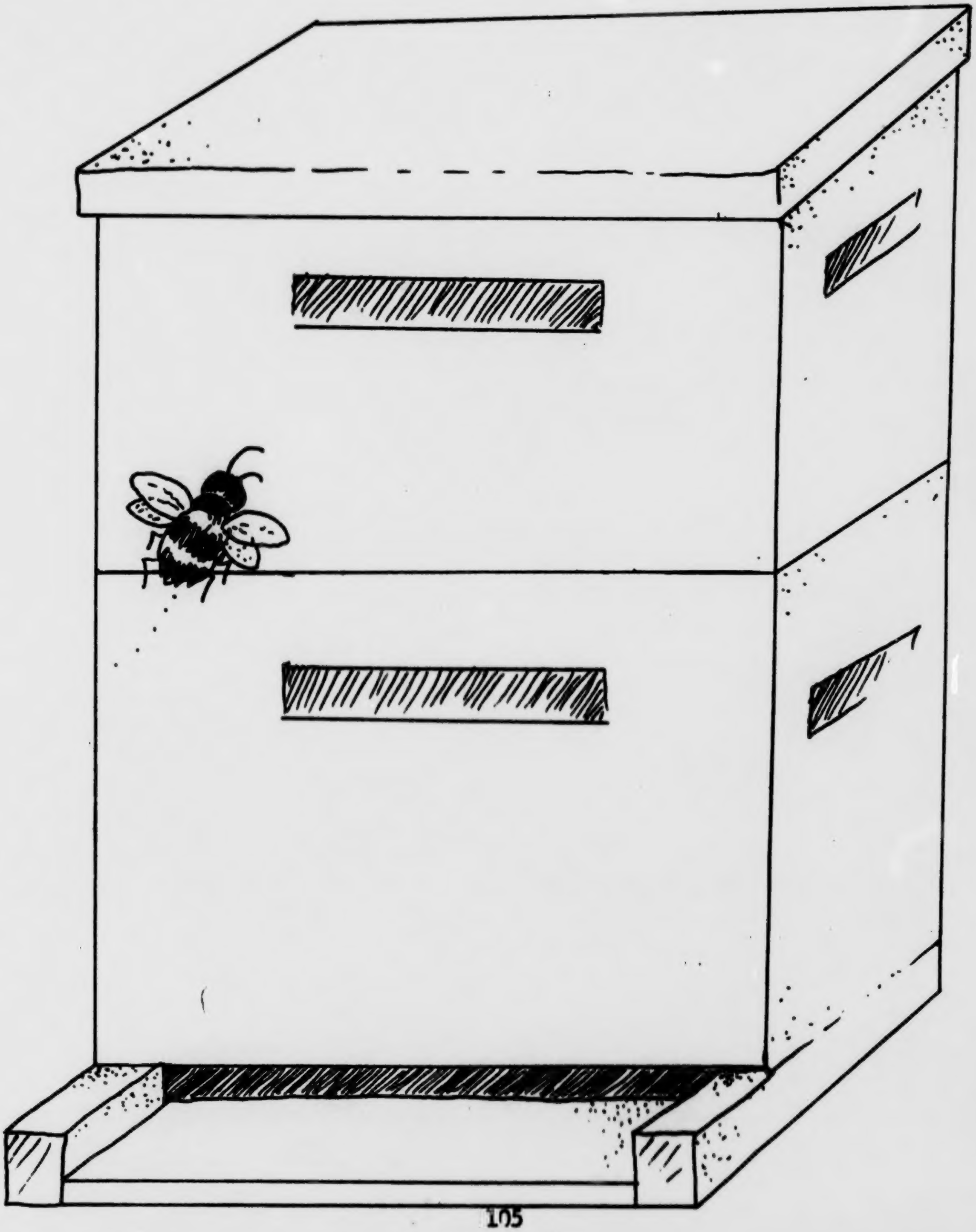


HONEY	HIVE	APIS MELLIFERA	LARVA	SUNFLOWER BUCKWHEAT ALFALFA
WORKERS	WHITEMAN'S FLIES	NORTH DAKOTA'S RANKING	EGG	BEESWAX
DRONES	APIARY	BEEKEEPING	HONEYCOMB	POLLEN
QUEEN	POLLINATION	ALFALFA CLOVER SUNFLOWER	SOCIAL BEES	PUPA

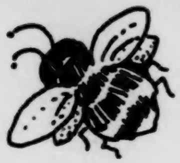
BEES
(Definition Cards)

Main sweetener of early settlers	Place where bees are kept	Scientific name of honey bee	Second stage of metamorphosis worms	Crops which bees pollinate in our state
Have many jobs in hive: makes beeswax, gathers nectar, etc.	Name given to bees by North American Indians	Near the top in honey production nationwide	First stage in metamorphosis	Used in face and hand creams
Male bees	A place where bees and beehives are kept as a source of honey	A sweet and rewarding career	A wax structure with six sides made by bees to store honey	Used by plants to help produce healthy new plants from seed
Lay eggs in hive	The act of transferring pollen to the female part of plant or flower	North Dakota flowers which bees gather nectar from	Bees which live in colonies such as honey bees	Third and last stage of metamorphosis cocoon

BEE TASK CARD



BEES



1. A strong hive of bees contains approximately 75,000 bees. That being true, how many bees would be living 20, 55, 100 hives?

(1,500,000; 4,125,000; 7,500,000 bees)

2. "White man's flies" are what North American Indians called the honeybees. Why did they nickname them this and what did they believe about the bees?

(The bees meant misfortune to the Indians because it meant the settlers had come, too.)

3. To gather a pound of honey the bee must fly a distance equal to more than three times around the world. What is that distance equal to in miles?

(24,901 miles x 3 = 74,703 equatorial circumference miles; 24,857 miles x 3 = 74,571 polar circumference miles)

4. You can see why the term "busy as a bee" came to be. What other farm analogies can you come up with?

5. You have heard the term "man hours" before--well, what about bee hours?! It takes 160,000 bee hours to produce a pound of pure ripened honey. How many would it take for ½ a pound? 12 pounds? 20 pounds?

(80,000 bee hours; 1,920,000 and 3,200,000 bee hours)

6. It is said that 4 to 6 tablespoons of honey a day will help you to be less nervous and help you to sleep better at night. If in fact you did take 4 tablespoons a day for a year, how much honey would you have consumed? (365 days = 1 year)

7. A honey bee makes 154 trips for a teaspoon of honey. How many trips would it make for 1 tablespoon? 1 cup? 1 pint? 1 quart? 1 gallon?

(462 trips; 7,392; 14,784; 29,568; 118,272 trips)

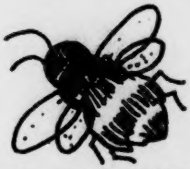
8. Saint Ambrose is the patron saint of beekeepers in a European country where the hives are called, "skeps." What country is this? Research other types of hives used today and from the past.

(Holland)

9. Today most beekeepers use a special type of hive in which to keep their bees. This hive is a stack of wooden boxes, with covers and bottoms so the bees can crawl between them. What is the name of this modern hive?

(Langstroth)

BEES continued



10. North Dakota is near the top in U.S.'s honey production. In 1982 alone approximately 20,000,000 pounds was produced! This is not only due to the large number of bees in our state but also because of the quality and quantity of nectar available from flowers grown in North Dakota. Bees gather the best nectar from what three Dakota flowers?

(alfalfa, clover, and sunflower)

11. Beekeepers must wear special equipment while caring for their hives. Below is a list of such items. Draw a picture of a beekeeper and give an oral report on each items specific use.

clothes fitted at the wrists and ankles
light colored clothing
veil and hard hat
no gloves--why?

12. The wonderful little body of a worker bee changes with age to meet the need of work it has to do. Find a diagram showing an adult worker bee. Label each part and explain its function.

13. Scientists divide bees into two main types. Social bees--those living in colonies; and solitary bees that live alone. Which type do beekeepers raise?

(Social bees)'

14. Create a book entitled, "All You Wanted to Know About Bees." You might include interesting facts about bees. You might include bee vocabulary such as:

drones
swarm
honeycomb
agriculture
pupa
pollination

hive
dancing
larva
workers
nectar
royal jelly

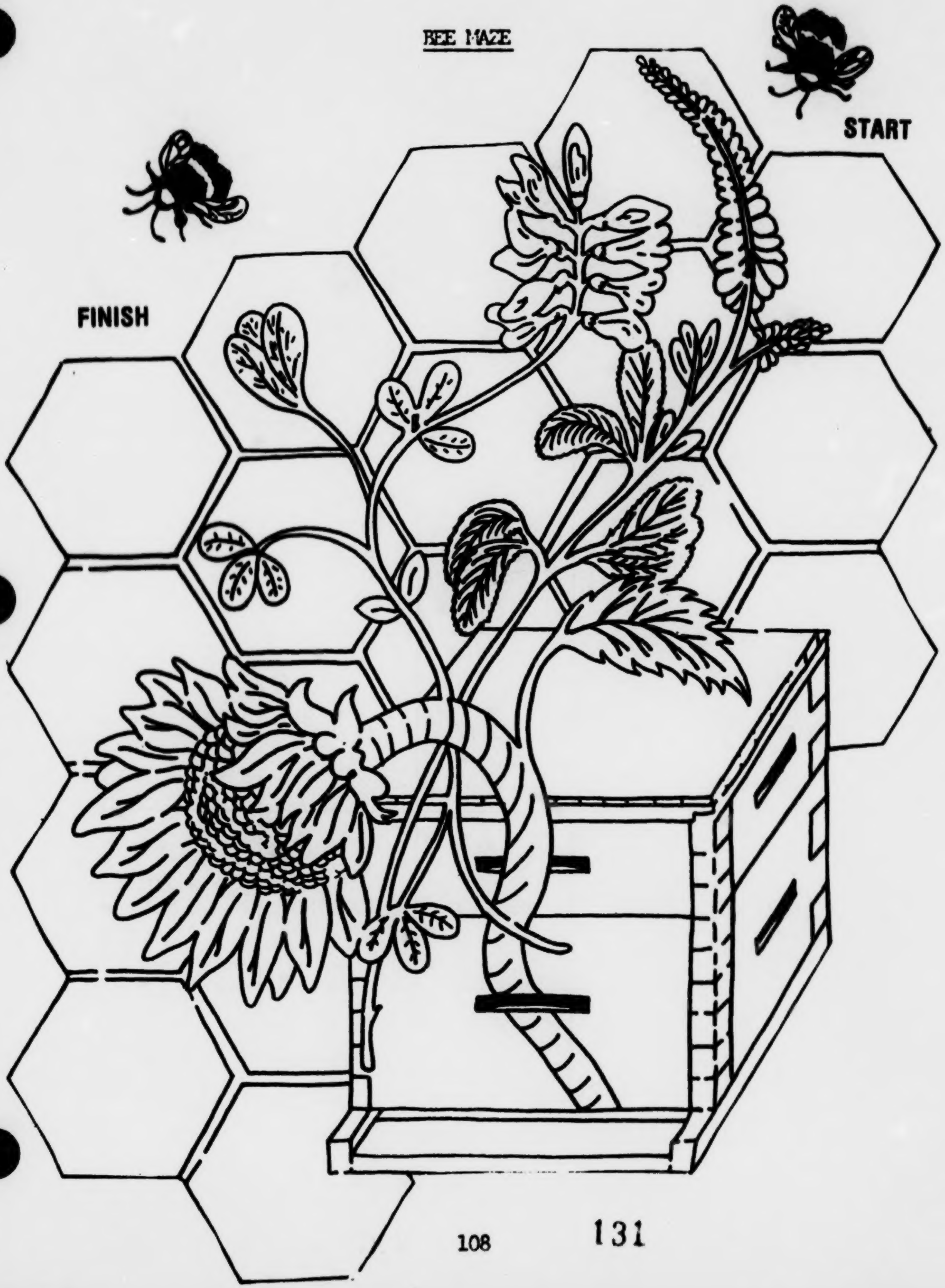
egg
queens
swarming
stinger
honey
propolis

15. Read several books about bees. The next time you see a bee you will know what the saying, "busy as a bee" really means. Then you can "thank it," "pity it," "admire it," and most of all let it live!

16. Early European settlers brought the honey bee to the United States in the 1600's. Honey was used as their main sweetener Honey is produced by the common honey bee. What is its scientific name? In North Dakota bees are essential in pollinating what three crops?

(Apis mellifera; buckwheat, alfalfa seed and sunflower)

BEE MAZE

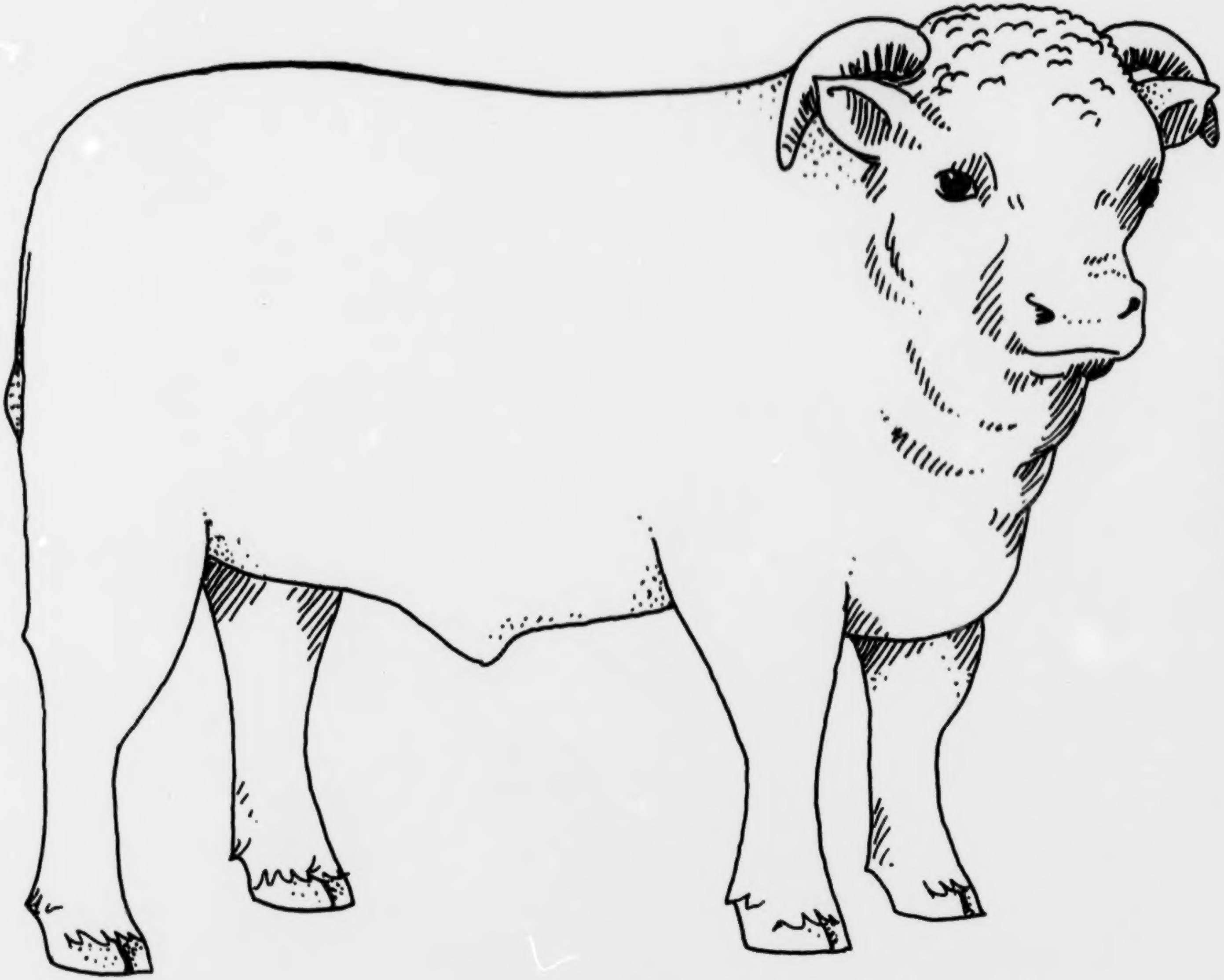

START
FINISH

BEEF CATTLE

PASTURE	FORAGE	ROASTS HAMBURGER STEAKS	1000- 1200 POUNDS	VEAL
CALF	COW	ROUNDUP	BEEF CATTLE	STEERS
HEIFERS	TRUCKS	BRANDING	CALVING	GREEN CALVES
FEED LOTS	SHORTHORN	HERD	HEREFORD AND ANGUS	NORTH DAKOTA RANCHERS

BEEF CATTLE
(Definition Cards)

Grazing areas for cattle	High quality hay crops that provide a source of energy to beef cattle	Cuts of meat obtained from beef cattle	Weight at which cattle are ready for market	Meat from calves less than 3 months old
A young cow or bull	A mother	The act of herding cattle together for inspection branding or shipping	Raised for meat	Male cattle with reproductive organs removed
Female cattle which have not mothered a calf	Provide transportation for cattle to markets	To mark or identify with a symbol	To give birth to a calf	Light weight calves fed with grass
Enclosed area where cattle are fed special feed	One of the English breeds of beef cattle	A group of cattle	Common breeds used in cross breeding	Dedicated people



BEEF CATTLE TASK CARD

BEEF CATTLE

1. Some breeds of beef cattle raised in the United States include:
   Aberdeen Angus   Hereford
   Brahma   Shorthorn
   Charolais

   Create a book about these beef breeds. Make a drawing of each type, research its origin, color and areas raised. Which ones are raised in North Dakota?

2. In North Dakota, raising beef is second only to grain farming in the eastern half of the state, but it gains even more importance the further west you travel across our state. What makes this area perfect for raising cattle?

3. Calving is an important part of beef cattle raising. Ranchers must keep the little "critters" warm and dry so they don't get sick and die. What time of the year are calves born?

   (Early spring)

4. Hereford and Angus have been popular breeds of cattle raised throughout our state. Recently, farmers have crossbred their animals. Thus ranchers have found these crossbreeds to be stronger and faster growing than the purebred. The Angus and Hereford have been a common crossbreed. What are some names of these new beef cattle breeds?

   (Beefmaster, Brangus, Charbray)

5. Calves are sent out to pasture for six to seven months until they reach a certain weight. What is this desired weight?

   (500 to 600 pounds)

6. The branding of beef cattle is an important task of the rancher. What other type of markings do ranchers use ?

   (Ear tags, chains, number branding)

7. The rancher and his beef cattle live by the calendar. Spring brings new calves. Summer is the grazing time and the time for moving cattle to new pastures. What major event occurs again in the fall?

   (Weaning--separating each calf from its mother. Roundup--bring cattle closer to home for the winter months)

8. What do beef cattle eat during the winter when they are not able to get grass from the pasture?

   (Ranchers feed them hay or grain or other special foods)

9. Research the life of a beef cow raised on a ranch in our state. Begin in early spring and include such things as--pasture, weaning, calving, auction ring, feeders, etc.

10. Not all cattle are cows. Being well-informed about such agricultural things is important for North Dakotans. Can you locate some definitions that will explain the difference between cows and cattle?
    Define these terms also: Heifer, Calf, Bull, Steer

    (Cow refers to cattle that are female and have had a calf.
    Cattle--can be small calves, bulls, heifers and cows)

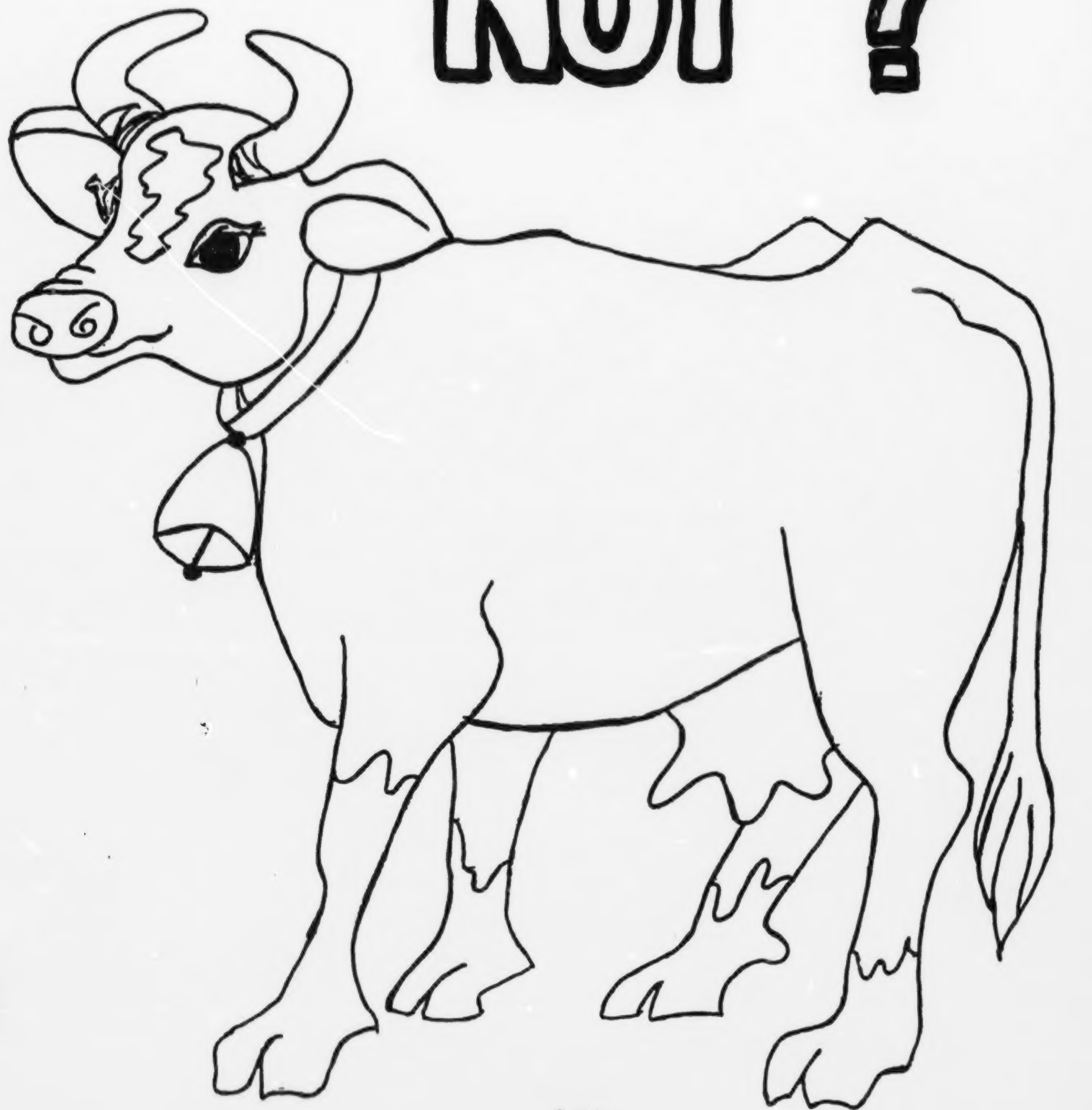
11. Did you know that the farmer must feed beef cattle every day of their life to "keep the plant running?"...in other words, to change the plant food the cow eats into food fit for human consumption.

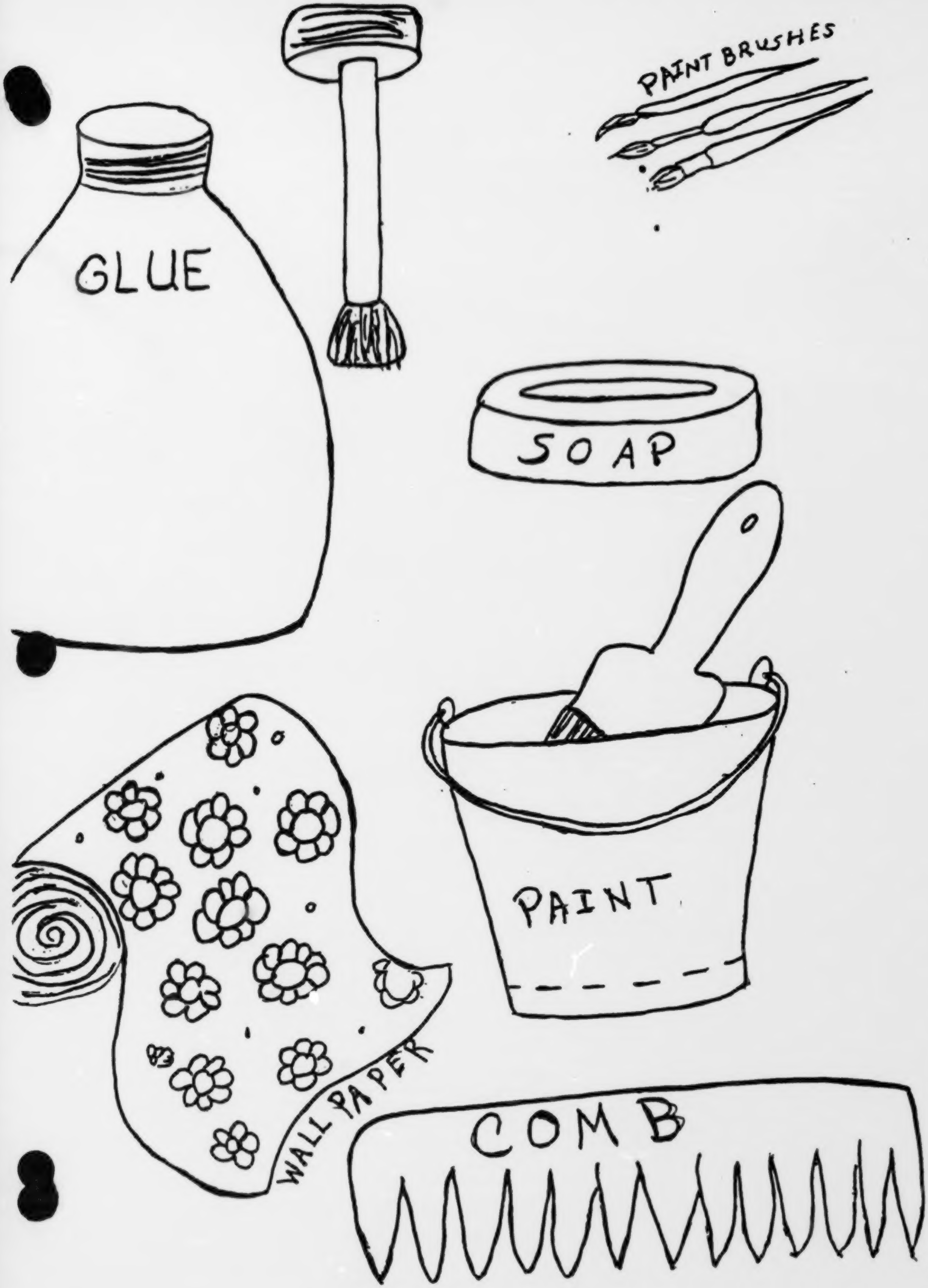
12. The final goal in raising beef cattle is high quality meat. The following list contains the 9 wholesale cuts.
    Round
    Sirloin
    Short loin
    Rib
    Chuck
    Fore shank
    Brisket
    Short plate
    Find out what part of the animal each cut comes from.
    What are some retail cuts of meat you might buy that were sliced from the wholesale cuts?

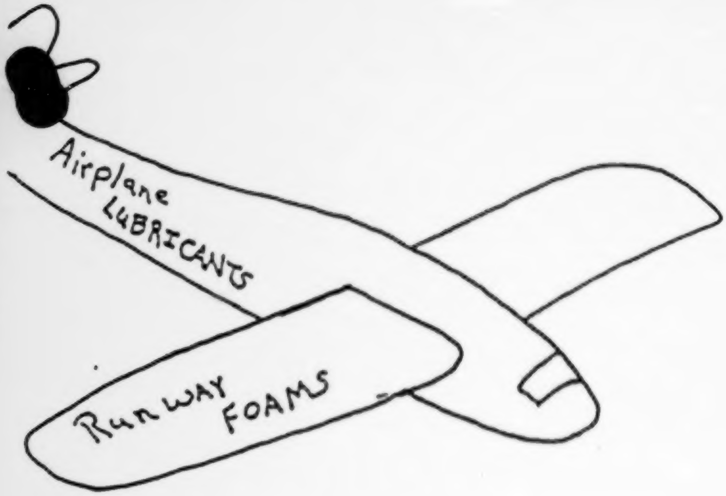
13. Beef production is big business in North Dakota! In our state, beef production is second only to wheat in total dollars returned to the farmer.

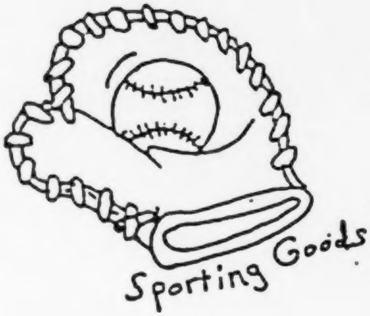
T R E N D * T R E N D * T R E N D * T R E N D * T R E N D * T R E N D
R N
E Before 1950, there were more milk cows that beef cattle in the E
N United States. But in 1954, beef cattle surpassed milk cows R
D and the difference has been increasing ever since. T
* *

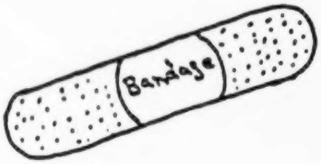
WHEN IS A COW NOT ?

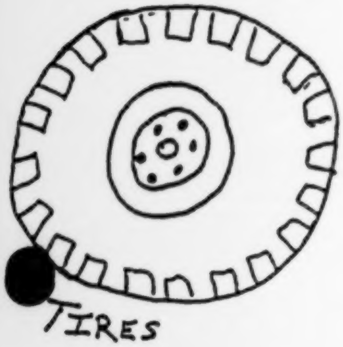


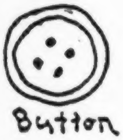

PAINT BRUSHES
GLUE
SOAP
PAINT
WALL PAPER
COMB


Airplane LUBRICANTS
RunWAY FOAMS


Sporting Goods


Bandage


TIRES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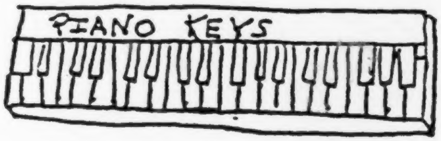
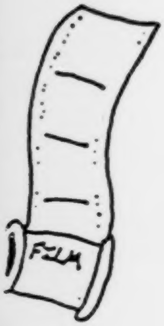
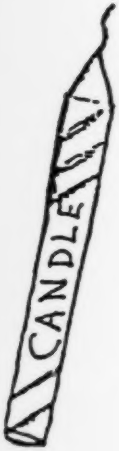
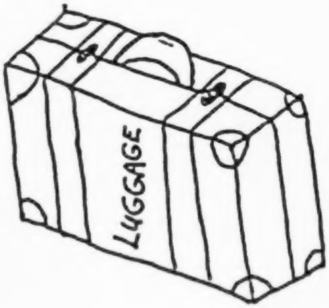
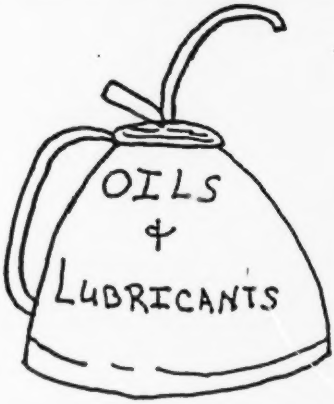
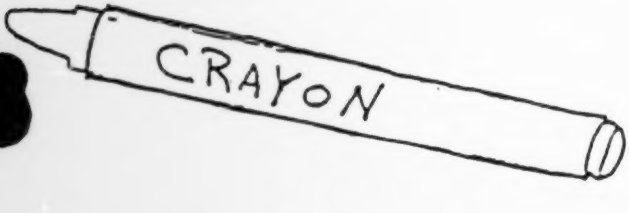

PIANO KEYS

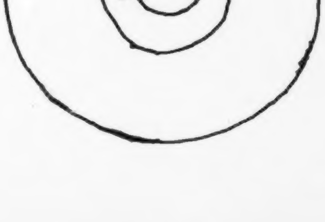

FILM


CANDLE


LUGGAGE


OILS
&
LUBRICANTS


CRAYON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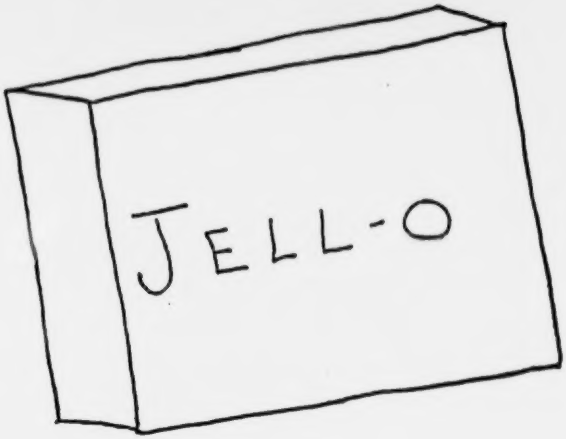
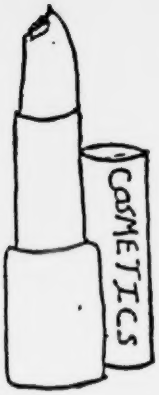
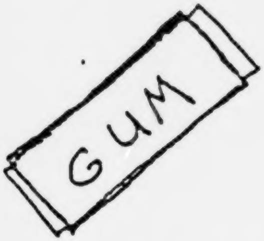

JELL-O


COSMETICS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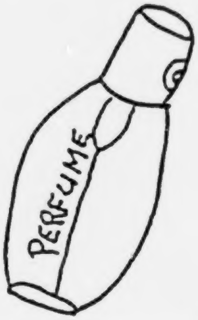
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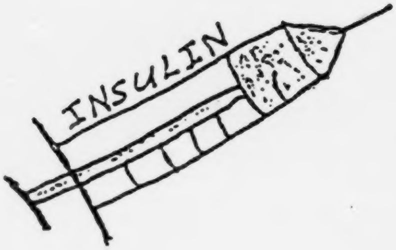
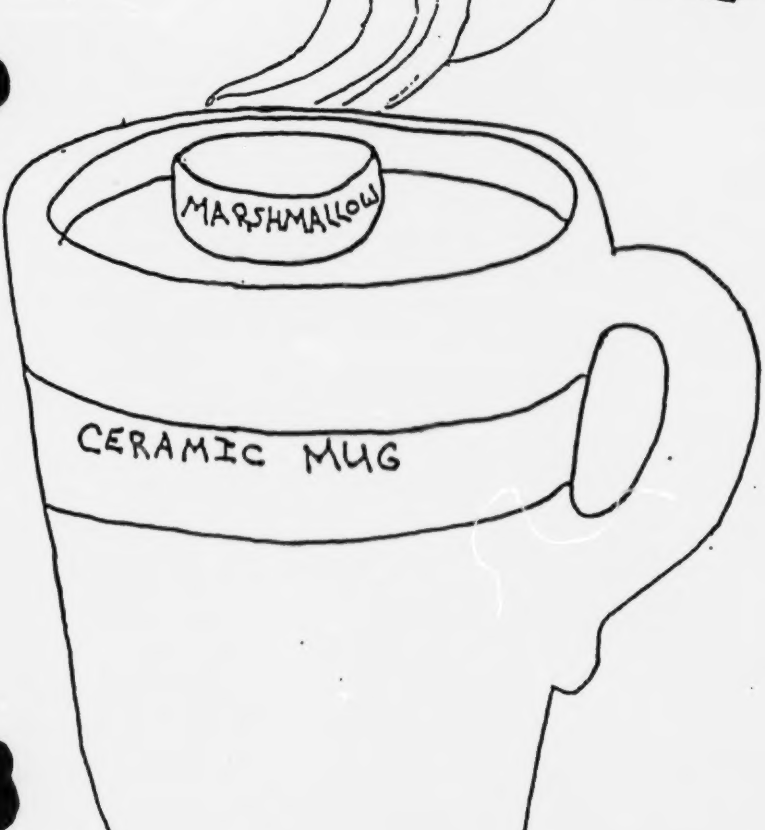
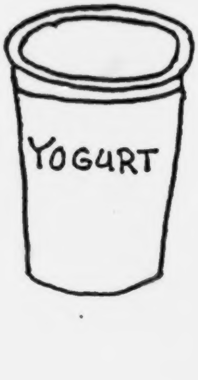

INSULIN


MARSHMALLOW
CERAMIC MUG

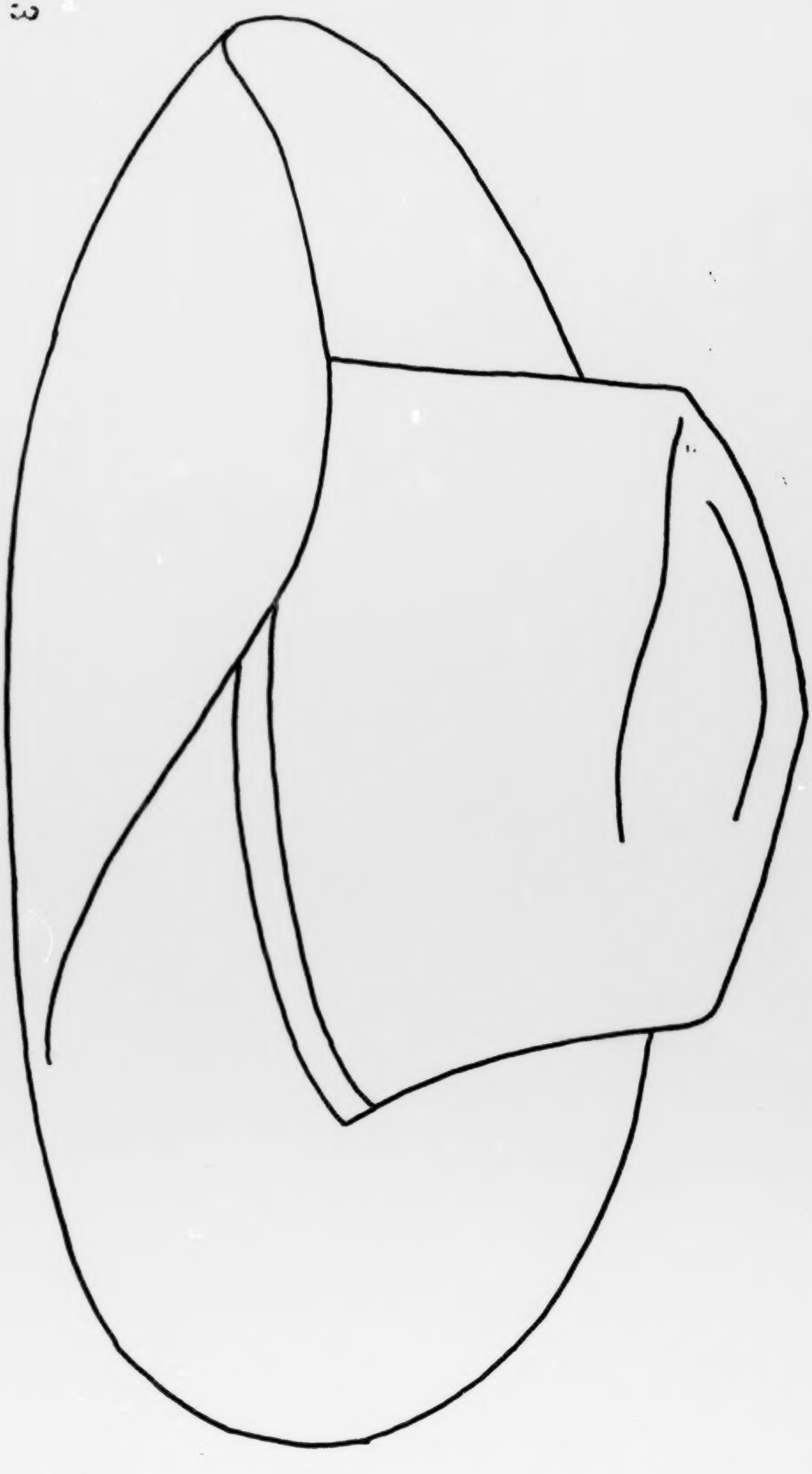

YOGURT

E	Y	L	R	C	A	N	D	L	E
S	O	U	E	R	S	T	R	K	F
E	G	G	T	A	W	A	X	E	S
M	U	G	Y	Y	T	P	E	N	T
U	R	A	R	O	A	H	U	T	N
F	T	G	O	N	R	S	E	I	I
R	B	E	V	S	O	A	P	R	A
E	D	S	I	K	N	L	A	E	P
P	L	A	S	T	I	C	S	S	S
W	I	S	O	K	D	B	H	R	E
S	H	O	E	C	R	E	A	M	H
D	S	A	L	M	E	E	V	A	S
I	B	O	O	T	S	F	I	Y	U
U	M	F	R	E	O	N	N	O	R
L	O	O	A	X	S	O	G	N	B
F	C	Y	G	T	T	R	C	N	T
K	E	M	L	I	F	I	R	A	N
I	N	S	U	L	I	N	E	I	I
A	D	B	E	E	F	R	A	S	A
N	O	T	S	S	U	P	M	E	P

BEEF (2)
BOOTS
CANDLE
COMBS
CRAYONS
FILM
FLUID
FREON
GLUES
GUM
INSULIN
IRON
IVORY
LEATHER
LUGGAGE
MAYONNAISE
OLEO
PAINTS
PAINT BRUSHES
PERFUMES
PLASTICS
SHAVING CREAM
SHEET ROCK
SHOE CREAM
SOAP
TEXTILES
TIRES
WAXES
YOGURT

RANCHING TASK CARD

143



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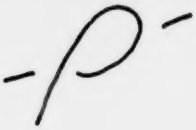
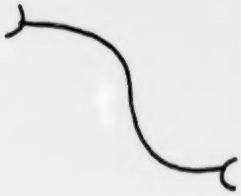
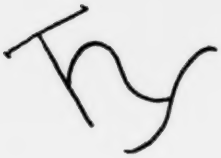
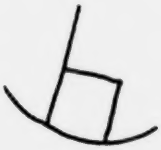
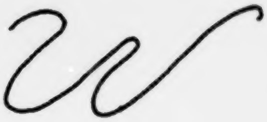


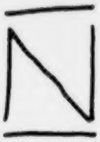
RANCHING









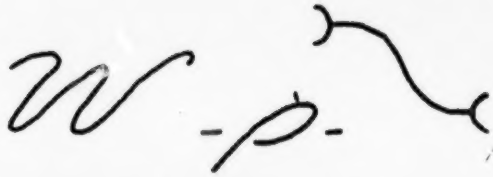


DICKINSON	THEODORE ROOSEVELT	MEAT PACKING PLANTS	CALVES	WEANED
MARQUIS DE MORES	ROUNDUP	ELKHORN AND MALTESE CROSS	GRASSLAND	FEEDER CATTLE
WESTERN NORTH DAKOTA	GRAZE	BRANDING	SLAUGHTER CATTLE	PROFIT
STOCKYARD	MEDORA	JOSEPH F. GLIDDEN	CORRAL	BARBED WIRE

RANCHING
(Definition Cards)

Center for early North Dakota livestock activity	A famous North Dakota rancher	Area where the meat is packaged	Young cattle	Calves that are taken away from their mothers
A Frenchman with a dream	Gathering animals for market	Ranches owned by Teddy Roosevelt	Area where cattle are grazed	Calves sold to feeders
Area of state where most beef cattle are raised	To eat grass	Marking the skin of cattle for identification	Fattened cattle ready for market	Money left over after goods are sold and bills are paid
Holding pens for cattle set up along railroad towns	Ranching town built by Marquis de Mores	Inventor of barbed wire	Fenced area to hold cattle	Invention which altered agriculture

RANCHING



1. Spanish explorers can be credited with bringing horses and livestock to the Americas. Columbus brought livestock with him on his second voyage in 1493. In fact, records show he had eight hogs on board!
Coronado brought several animals with him in the 1500's. Can you find out which ones?

2. The first herds of cattle in Southwest North America were descendants of the Longhorned cattle of the near-desert areas of North Africa. How did this help them to adapt to the Plains?

   (the Plains are dry)

3. Two facts at first stopped the rapid growth of ranching on the Dakota plains--
   A) No customers because it was an unsettled area
   B) No transportation available to far-off markets in St. Louis
   What two facts changed both of these drawbacks?

   (1. 1862--The Homesteaders Act
   2. 1869--The transcontinental railroad was completed)

4. When the lawmakers in far-off Washington, D.C. passed the Homesteaders Act, most of them had never even seen the Plains and knew nothing about the area's climate. To them, 160 acres was a generous grant. But not so to the Plains rancher; 160 acres was nothing! It took 10 or 20 times that much land to support a small cattle ranch in southwestern North Dakota. Using those estimates, how many acres would the rancher have needed? How could the government have justified the acreage difference between the farmer and rancher?

5. Consider the quotation, "There is nothing as unequal as the equal treatment of unequals." Does it apply? Stage a debate on this question. Who should receive more free land--the rancher or the farmer? Listen to both sides.

6. Some of the early ranchers themselves were governed by unwritten laws. One such law said, "first come--first served." In other words, the man who got there first had the use of the land; other men had to keep their cattle off. What problems do you suppose developed from these unwritten laws?

RANCHING Task Cards continued

7. The winter of 1886 brought intense cold and howling blizzards. As a result, about one-half to three-fourths of the cattle population froze or starved to death. But for every evil, there's a little good. What could be the advantage of cattle freezing to death?

   (This reduction in cattle population relieved the overstocked ranches in the state)

8. The cowboy working the ranches of North Dakota wears special clothing and uses special equipment. Find out the names and uses of these articles of clothing. Why not design and write a book entitled, Special Clothing for Special Agricultural Occupations. You might include:

   the beekeeper　　the cowboy　　the dairyman
   the farmer　　the sheepherder

9. Research the winter of 1886-1887. Why do you think it's been called the "White Death?"

10. Dickinson, known as the Queen of the Prairies, was the center for the area's early livestock activity. Why did the Texas cattlemen like the range land that lies between Bismarck and Montana for fattening up their own cattle?

    (The land in North Dakota was excellent for fattening cattle--unlike Texas, which had heat, pests, lack of water and good grass)

11. You may wish to research or just read about the lives of these colorful personalities connected to the range-cattle industry.
    Howard and Eldon Eaton--Custer Trail Ranch
    A.C. Huidekoper--Custer Trail Cattle Company
    Sylvane and Joseph Ferris--Maltese Cross Ranch

12. Early ranches in North Dakota were started by many Texans, railroad employees and hunters such as Teddy Roosevelt. Roosevelt's life was greatly influenced because of his experiences on the ranches in our state. Research Roosevelt's life and his North Dakota stay. Create "Teddy the Cowboy" in cartoon form.

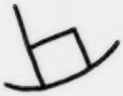
13. Many Texas companies owned and operated the first ranches in North Dakota. Some of the companies were:
    Continental Land and Cattle Company,
    Towers and Cudgell (the Ox brand)
    The Berry, Boise Cattle Company (the three Sevens brand)
    Reynolds Brothers (the Long X brand)
    How do you feel about letting outsiders buy North Dakota land?

14. DeMores built the town of Medora, which was named after his wife. The town was complete with eighty-four buildings including three hotels, a church, a dry-goods store, and a newspaper, The Badlands Cowboy. Pretend you are the editor of this newspaper. Put out a first edition complete with editorials, advertisements, cartoons, sports, ranching news and a society page.

15. As the cattle herds grew on the Plains, some ranchers became tempted to overuse the land. Why not, many were using land that was not theirs. Many stopped shifting cattle between summer and winter pastures. Grassland that should feed one steer to forty acres was being used to feed three or four steers.
    Make a comparison between the overuse of land in farming and in ranching.
    Research the Soil Conservation Service. What impact did they make on the use and abuse of the land?

16. One cannot study North Dakota ranching without being touched by the dreams of the young wealthy Frenchman, Marquis deMores. He opened a ranching business, started a town and built a meatpacking plant. He built refrigerated railroad cars in which to ship meat east. DeMores even built cold storage plants in towns along the route to his stores in New York.
    A) What caused this wonderful ambition to fail?
    B) What was "White Death?"
    C) How long did the plant operate?
    D) What if deMores' dream had been realized? Speculate how this might have changed North Dakota. Write a book about it.

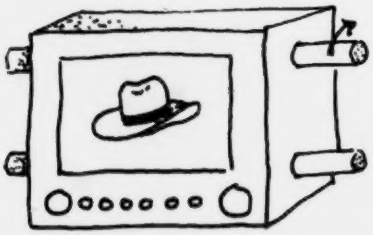
RANCHING Task Cards continued

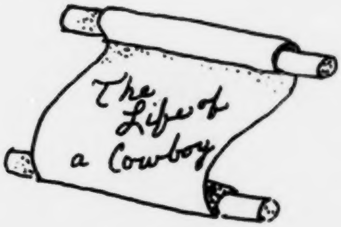


17. As more and more people settled on the Plains, a need arose for an effective way to fence off claims and to prevent cattlemen from driving their herds over cultivated fields. Neither wood nor rock was readily available. Hedge experimentation was conducted by the U.S. Department of Agriculture, but hedges, just like trees, did not grow well on the semi-arid Plains. Wire was tried but the cattle could easily break through it.
In 1874, a revolutionary agricultural development occurred one which greatly aided in the settlement of the Great Plains. Research Joseph F. Glidden and his great contribution to agriculture. Design an advertisement on a poster. Try to persuade a North Dakota farmer or rancher of the worth of this new invention.

18. Barbed wire, as great an invention as it was, also had its drawbacks. When a horse stumbled into a chuckhole, both it and the rider could suffer lacerations from being thrown into the sharp wire. Rust also caused a problem. Both cattle and people can develop a serious disease if cut by rusted barbed wire. What do you think this disease was? What has been done to prevent this disease?

19. The cowboys and their life as seen on the television screen bear little resemblance to what the real cowboys of the past were like. Read several books to understand what the cowboy's life in North Dakota was really like.
Create your own documentary, complete with a television set (box and paper roll) on this subject.




The Life of a Cowboy

20. Survey ranchers in your area and find out how many have had trouble with cattle rustlers. If any have, find out what they have done about it.

WANTED: YOU!

(Portrait drawing)

SUPPLIES:

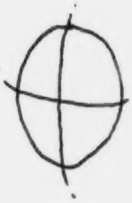
- Drawing-paper
- pencil
- mirrors
- colored pencils
- Poster-cardboard (9x12 or larger)
- white glue (Elmers)
- printing ink or tempera paint
- cookie sheet or flat non-absorbent surface
- brayer

INTRODUCTION: Stealing a person's horse in the Wild West era was like stealing someone's car today. It was a very serious crime because it was their only means of transportation. Stealing cattle was also a major problem. Rustlers were once common to the ranching areas of North Dakota and still are occasionally today.

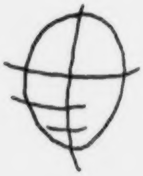
Why not create a WANTED poster with YOU as the Wild West villain!

PROCEDURE:

1. Study your face in the mirror. Examine your features. Where are your eyes in relation to the corners of your mouth? How much space is between your eyes? Compare the space from the end of your nose to your upper lip with the space from your lower lip to the bottom of your chin; are they the same or is one a bit bigger?



2. Compare your features with another child's. What similarities are there? What differences?



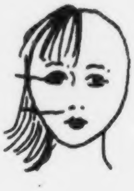
3. The following proportions are standard guidelines that artists use when drawing a portrait. Compare them to what you've discovered in your observations.

   a) The eyes are in about the center of the head (from the top of the head to the chin).

   b) The bottom of the nose is slightly less than half way between the eyes and chin.

   c) The distance between the eyes is about the length of one eye.

   d) The corners of the mouth line up vertically with the pupils of the eyes.



4. What makes you look like you? Remember the above guidelines are only guidelines, not rules; everyone is unique and special. Are your eyes round or narrow? Is your nose long or short? How are your eyebrows shaped? Do you wear glasses or have freckles? All these special things are you!

5. Now draw a light oval on your paper, lightly indicate the location of the features and create you!

WANTED: YOU! CONTINUED

PROCEDURE CONTINUED

6. Write the word 'WANTED' and your name heavily on a thin paper. Turn it over and copy this backwards writing on the cardboard.

7. Using a glue bottle as a pen write 'WANTED' backwards at the top of the cardboard. Then write your name backwards at the bottom of the cardboard.

8. Let the glue dry overnight.

9. Place tempera or a small amount of printing ink on the cookie sheet. Roll it back and forth with the brayer until it is even.

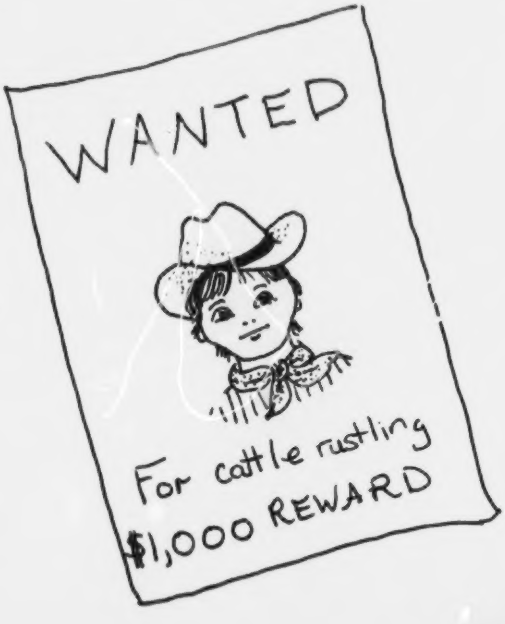
10. Now roll over the glue letters, making sure they are well covered. Try not to get paint on the rest of the cardboard.

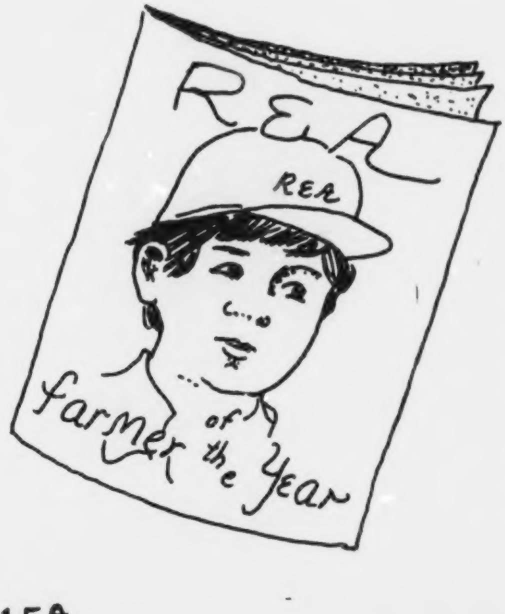
11. Carefully place a piece of paper over the cardboard. Rub the paper with the side of your hand.

12. Lift off the paper. Your letters will now appear forward!

13. Let the ink dry. Now glue your self-portrait in the center of your poster.

ANOTHER IDEA: Put your self on the cover of REA magazine. Write an article explaining why you are such a famous farmer or rancher.





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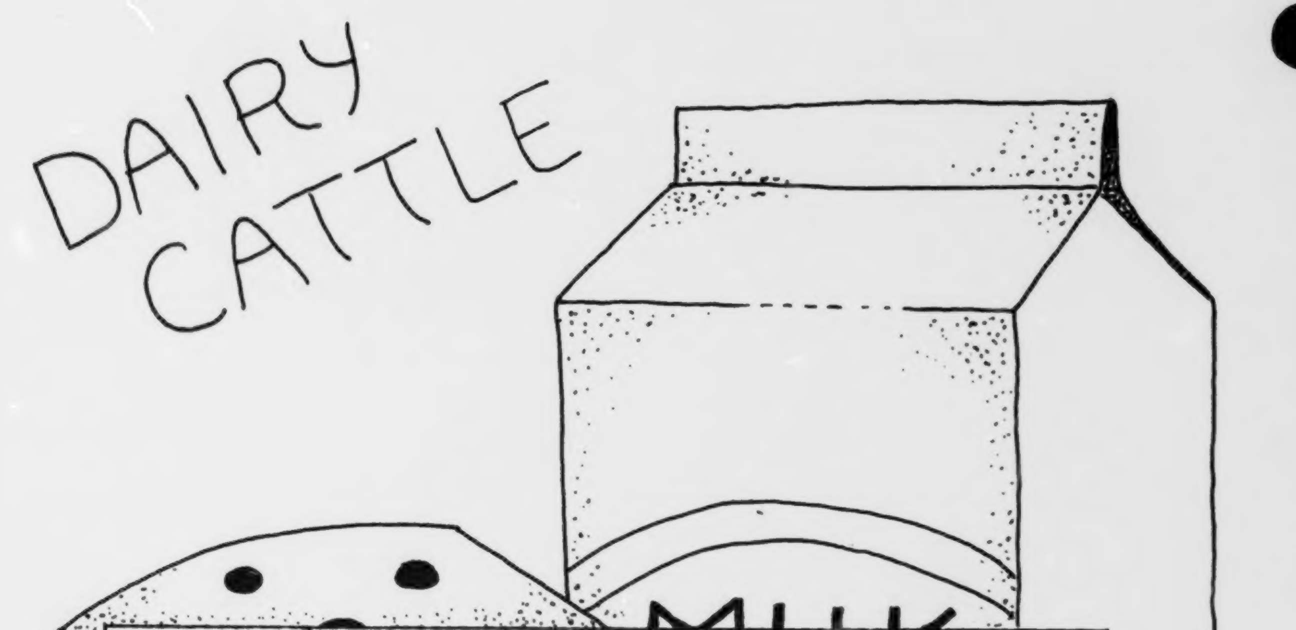
DAIRY CATTLE

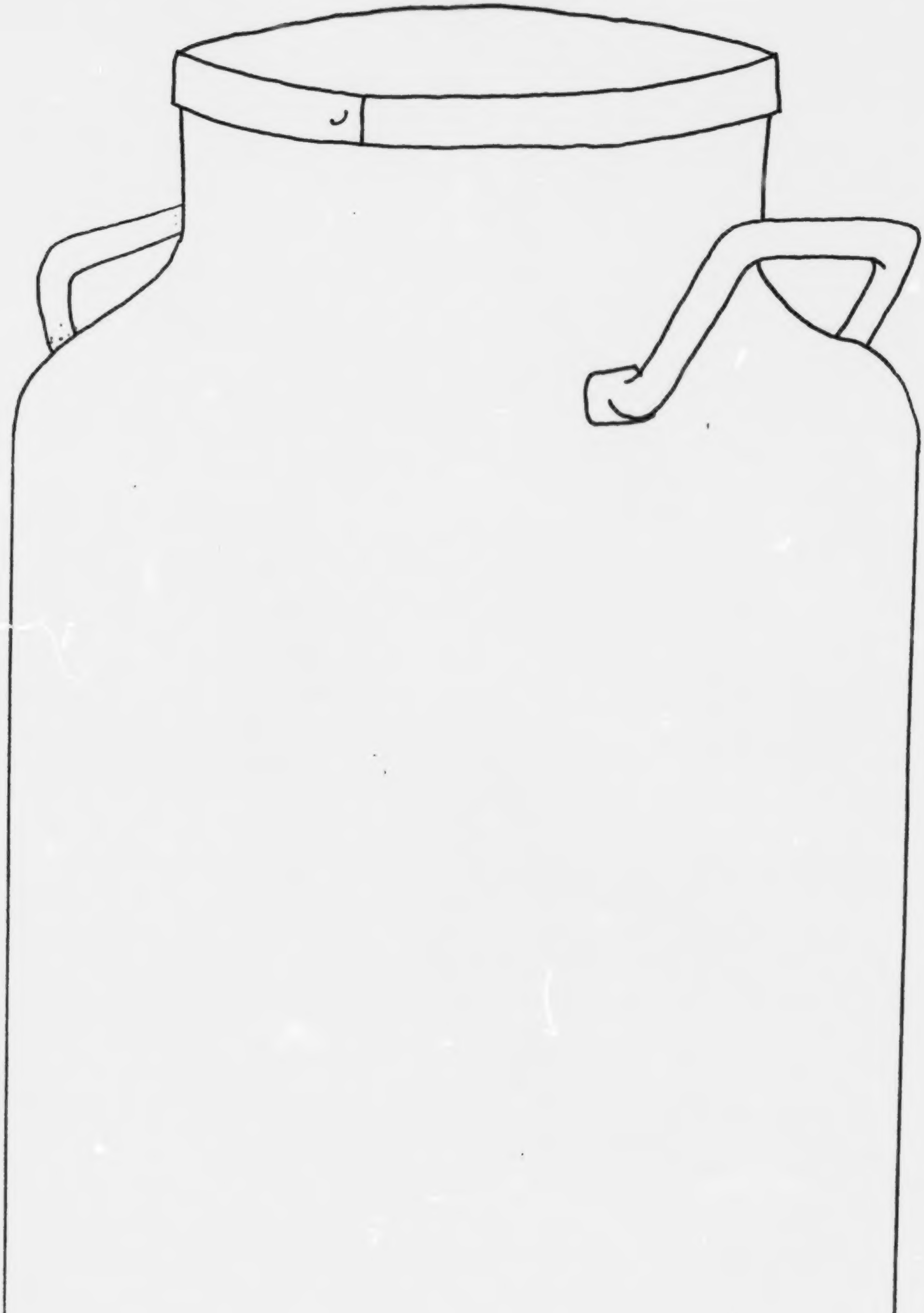


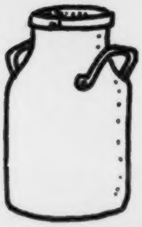
PASTEURIZATION	GRADE COW	20 GALLONS	HOLSTEIN	MILK NUTRIENTS
MAMMARY GLANDS	MILK PRODUCTS	UDDER	SWITCH	STALL FEEDING
ALVEOLI	100 POUNDS	CLOSED SYSTEM	CUD	LOUIS PASTEUR
RUMEN	COLOSTRUM	BROWN SWISS	MILK LETDOWN	HOMOGENIZATION

DAIRY CATTLE
(Definition Cards)

Process to kill harmful germs	Cattle not registered with a breed association	Average daily amount of water consumed	Breed that gives the most milk, black and white in color	Carbohydrates, fats, minerals, proteins, vitamins
The udder is made up of four quarters	Butter, cheese, ice cream, evaporated milk	Milk is made and stored in a cow's udder	Brush of hair at the end of a cow's tail	Introduced to the dairy business in the 1600's
The tiny milk making parts of the udder	Average size of a newborn calf	A milk machine pumps milk directly from the cow to a closed pail	Cows spend about 8 hours a day chewing this	Invented pasteurization
First part of a cow's 4-part stomach	Special yellow milk made by the cow for her newborn calf	Good milk producing cows, solid brown in color	Milk is brought all the way down in the udder for milking	Process of breaking up fat particles in milk to spread them evenly in the fluid

DAIRY TASK CARD





milk
ice cream

DAIRY CATTLE

1. A good producing cow gives about 40 to 60 pounds, or 18.6 to 28 quarts of milk a day. How many quarts would this be in a week; a month; a year?

   (130-195 quarts a week; 560-840 quarts a month; 6,770-10,156 quarts a year)

2. Cows like routine and if they are upset they will produce less milk. Thus the daily chores on a North Dakota dairy farm are probably the same day in and day out.

3. A cow produces the most milk right after she has had a calf. Thus most dairy farmers plan to have most cows produce a calf once a year. It also increases the herd size.

4. North Dakota dairy farmers raise many dairy cattle that produce milk to sell. About half of the milk produced is used for drinking. What is the other half produced used for?

   (Making butter, cheese, evaporated milk, ice cream and dried milk products)

5. A modern day dairy farmer has put the milking stool to rest. Farmers have electric milking machines to do the milking for them. As many as 50 cows might be milked in just one hour!

6. In the 1600's, stall-feeding made it possible for year-round production of milk by dairy cows. Research what this method was and where it originated.

   (Colonists of Massachusetts began feeding grain and hay to the cows during winter)

7. Before 1840, farms and cities were close together and it was not hard to supply milk to the towns. But as cities grew, it became more difficult to supply milk to meet city demands. What important development helped to solve the problem?

   (Development of the railroad and specially designed cars to keep the milk cool over long distances)

8. Look up the words, "pasteurization" and "homogenization." What is the difference between these two processes?

9. Use encyclopedias to research milking machines and how they work. Explain the procedure or make a diagram explaining the parts and functions of milking machines.

10. Proper diet is important to the dairy cow to insure a healthy animal that will produce quality milk. Dairy cows need feed that contains energy, protein, and minerals such as calcium. What are the main foods fed to the cows by the dairy farmer?

    (Concentrates--grains and by-product feeds; roughage--pasture, hay, silage; and fresh water, salt and minerals)

11. Dairy barns are kept very clean to protect against milk becoming contaminated. State and local governments have laws regulating the dairy products to be sold. How do Grade A standards regulate sanitary conditions?

    (Grade A regulates the health of cows, and sanitary conditions inspects barns, cows, workers, and equipment)

12. Keeping the milk cooled at just the right temperature is important for fresh tasting milk and to keep the bacteria count low. How do you suppose dairy farmers kept milk cool before refrigeration?
    (Old springhouses were used--milk was put into cans and the cans were stored right in the cool spring water)

13. Dairy cows, as well as beef cattle, sheep, goats and deer are called "ruminants." Ruminants are animals that chew their cud. These animals have a special, four-part stomach to aid the digestion of grains and grasses. Look up "ruminant" in the encyclopedia. Find out what special job each of the 4 parts of the stomach perform during digestion. The 4 parts are:

    1) rumen
    2) reticulum
    3) omasum
    4) abomasum

14. A dairy cow makes a special milk for her newborn calf. It is yellow in color and provides extra vitamins, protein and antibodies to protect the calf from disease. This special milk only lasts a few days, then the milk changes back to ordinary white milk. What is this special yellow milk called?

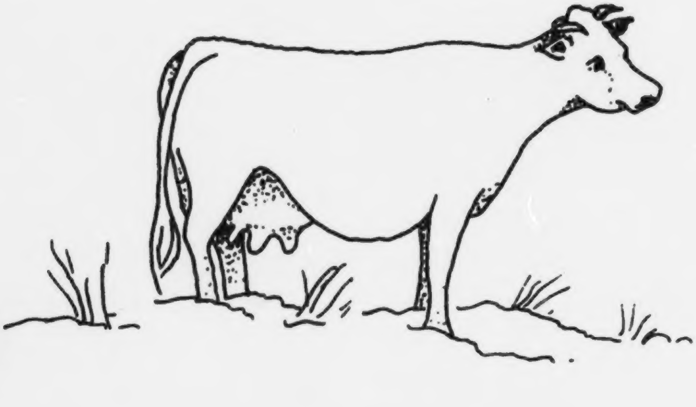
    (colostrum)

15. The dairy cow is truly an amazing milk machine! Milk is made in the cow's udder. Food eaten and digested is raw materials for making milk. These raw materials are carried by the cow's blood to the udder. The blood works very hard. For every gallon of milk produced there is 400 pounds of blood flowing through her udder! Before the farmer can get milk from a cow he must do what is known as "milk letdown." What is milk letdown? Milk letdown can happen different ways. What are some of these ways?

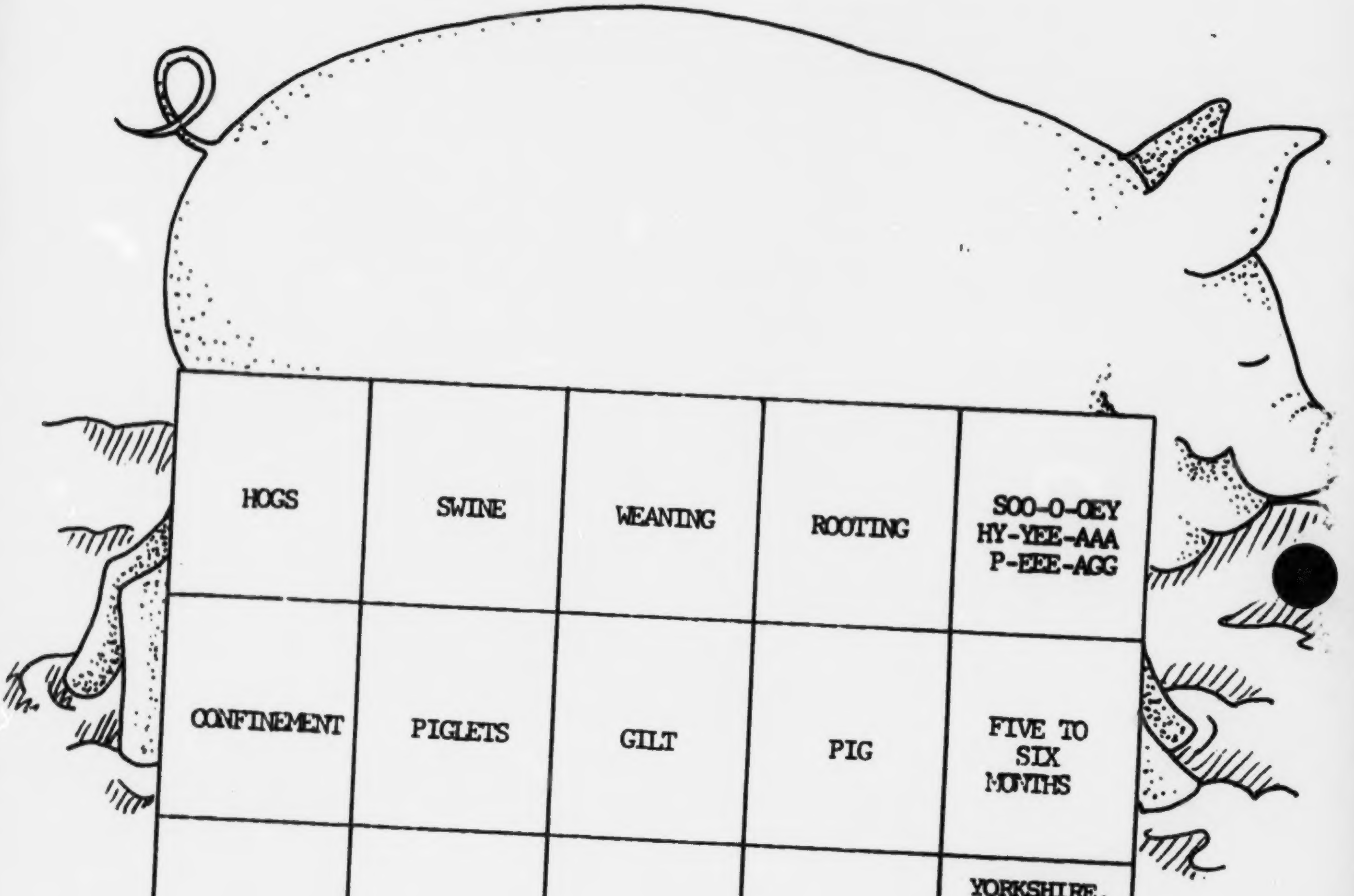
    (Milk letdown is when milk is squeezed from the alveoli into the milk ducts and gland cisterns. It happens by washing or massaging the udder, or just hearing milking-time sounds from the barn may induce milk letdown).

16. Dairy cattle are cows kept for milking. What type of dairy cattle gives the most milk?

    (Holstein)



PIGS

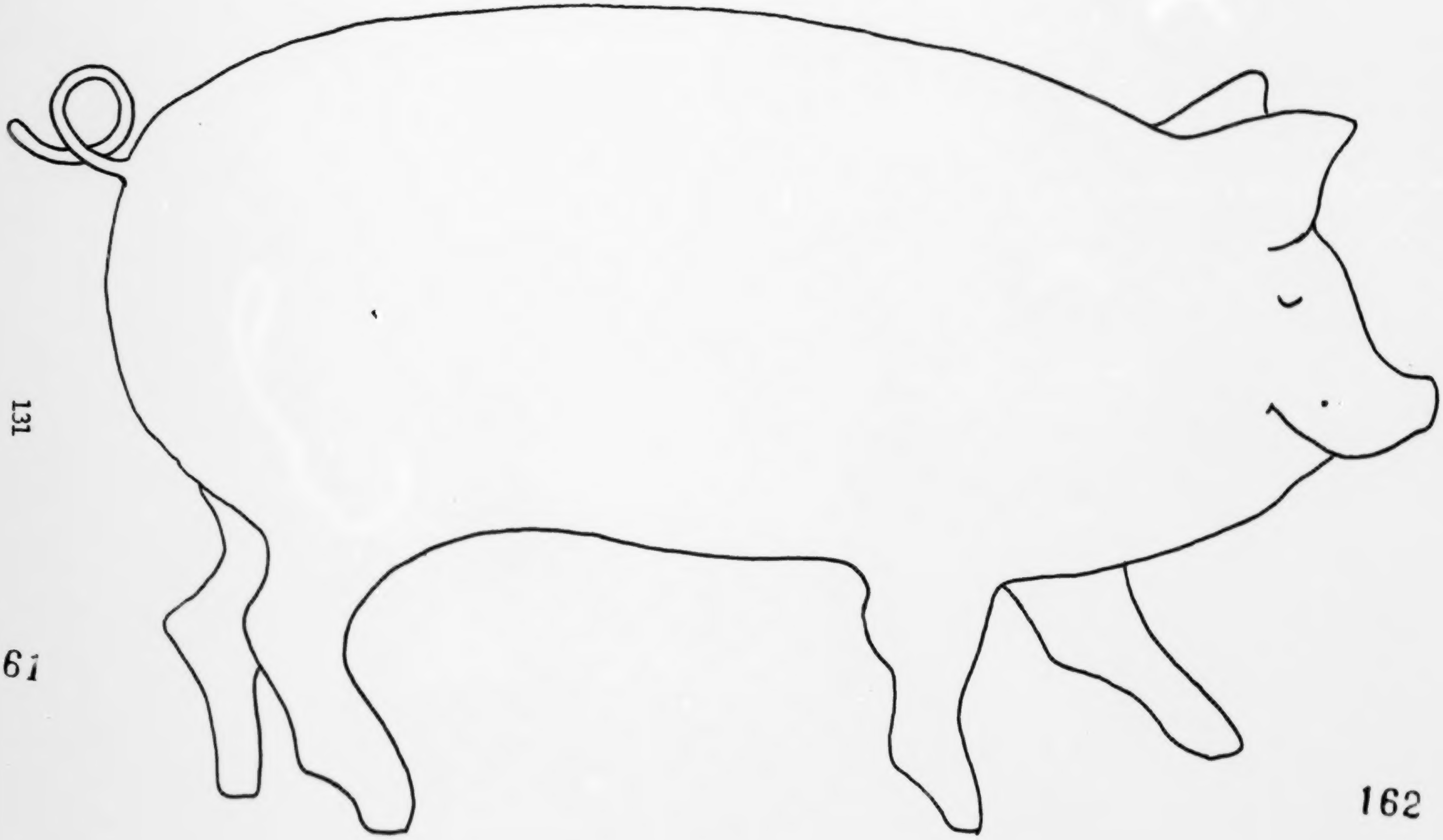


HOGS	SWINE	WEANING	ROOTING	SOO-O-OEY HY-YEE-AAA P-EEE-AGG
CONFINEMENT	PIGLETS	GILT	PIG	FIVE TO SIX MONTHS
LITTER	SOW	PORK	OMNIVOROUS	YORKSHIRE, DUROC, CHESTER WHITE, BERKSHIRE, HAMPSHIRE
FARROW	MARKET HOG	SNOUT	LARD	CORN

PIGS
(Definition Cards)

Older pigs of heaviest weight	Another name for hogs	Separating piglets from their mothers permanently	Pigs pulling vegetable roots from the ground by their snouts	Pig calls to round up hogs
A process of raising pigs indoors throughout their life	Baby pigs	Female pig less than one year old	A younger hog, less than ten weeks old	Average amount of time to raise a pig for market
Sows can give birth to 7 to 12 pigs at one time	Adult female pig	Meat from pigs	Pigs eat both plants and meat	Some breeds of pigs found in North Dakota
To give birth to pigs	A pig being raised for meat	Nostrils used to root or dig for vegetable roots	Made from pig fat	An important food for hogs

SWINE TASK CARD



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SWINE

1. On many North Dakota farms, pigs are housed to protect them from the cold. Some farmers run intensive pig farms where the animals are kept indoors throughout their lives. Thus the growing conditions are carefully controlled. What is this process called?

(Confinement)

2. Throughout North Dakota, hogs are raised commercially. They are finished and ready for market at what age?

(Six months)

3. The premiere edition of the magazine entitled Country Kids has an excellent pull-out section all about pigs. You will want to "pig out" reading this! (December 1982)

4. Pigs are very intelligent animals!
Pigs are clean animals!
Pigs are one of the few animals that won't overeat!
Pigs are being misrepresented!!!

How many pig sayings have you heard that aren't true? For example, "This place looks like a pigpen!" Make a list and share with a friend.

5. Create a Little Piggy Bank Book. In it save pig words and definitions you can "bank on." You might include such words as;

omnivorous
boar
swine
farrowing house
feeder pigs
market hogs
gilt
pork
litter
farrow
weaning
piglets
pigs
hogs
herd
sow
snout

6. Research and find several "pigs" used in literature. For example;

"The Three Little Pigs" or "This Little Piggy Went to Market"

Rewrite these stories or poems with a North Dakota setting.

SWINE Task Cards continued

7. Research several types of pig breeds. Create a picture book about them. Find out if any of these breeds are raised in North Dakota. Your list may include;

Berkshire
Duroc
Yorkshire
Poland China
Hampshire
Chester White
Spot
Landrace

8. This little piggy went to market...but to reach market weight of 220 pounds takes 5 to 6 months. This piggy must eat about 15½ bushels of feed. This is 870 pounds of feed. Of that, 750 pounds is corn so how many pounds of the total feed is protein and mineral supplements?

(120 pounds)

9. Pigs are excellent mothers and give birth to a litter twice a year. Each litter averages seven to eight pigs but as many as 10 to 12 is common. The number of 27 piglets at one time has been recorded. At what age can a sow reproduce?

(8 months)

10. Read the classic favorite, Charlotte's Web. Continue the story on from where it ended and give it a rural North Dakota setting.

11. Pigs are omnivorous. What does this mean? What other farm animals are omnivorous?

(They eat both plants and meat.

12. What is the difference between a pig and a hog?

(A pig is younger and weighs 100-120 pounds, whereas a hog is older and weighs much more)

13. Did you realize that long ago farmers somewhere discovered that pigs were unlike other livestock in that they don't have to be rounded up? It's true! Pigs will come running--but only to a particular call. Some common calls include;

SOO-o-oeyy
HY-yee-aaa
Who-o-eeyy
P-eee-agg

Can you find out how some North Dakota farmers call their pigs?

14. Pigs are generally remembered for their snouts. What purpose do their snouts have? How do farmers protect their pastures from being "rooted?"

(Snouts are nostrils which are used to root or dig for vegetable roots, one of their favorite foods; farmers sometimes slip a metal ring through the nostrils, thus the ring hurts the snout if a hog roots)

15. Pretend you are a North Dakota grocer. Feature pork as this week's special. Create a poster to persuade shoppers to buy these pork products. Remember, the pig provides us with many products such as:

pork chops
ham
bacon
sausage
lard
spareribs
ground pork
pigs feet
pigs knuckles
loin roasts

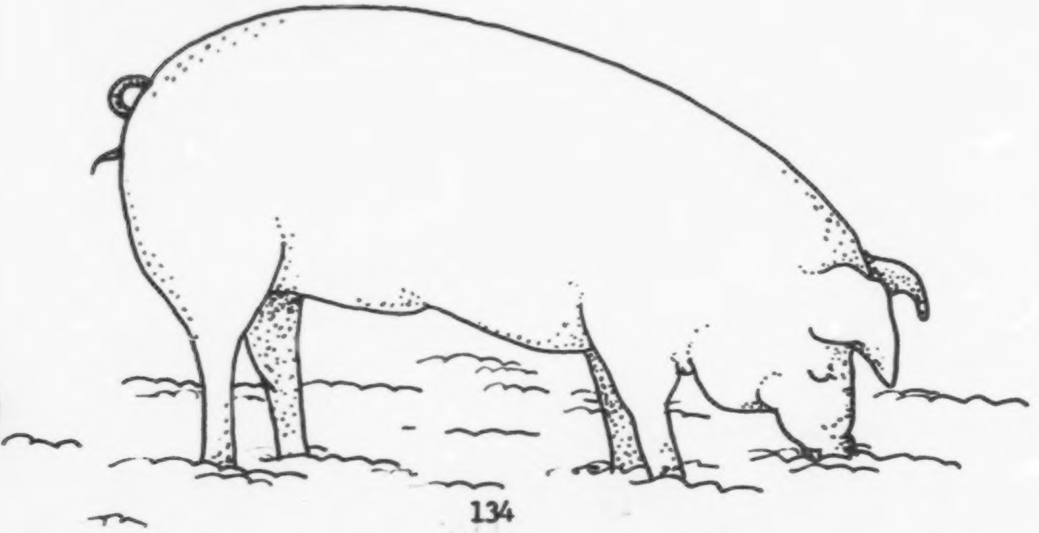
16. "Hog is man's best friend."

Defend this statement and write of the value of hogs in our life.

17. Create a pictograph showing the leading hog raising states as well as North Dakota. Although we are not a leader we "bring home the bacon," too!

18. People in other parts of the country and the world eat other parts of the hog's body. Research in the encyclopedia to find out what parts these are. In the southern United States people enjoy fried chitterlings. What are they?

(hog intestines)



POULTRY

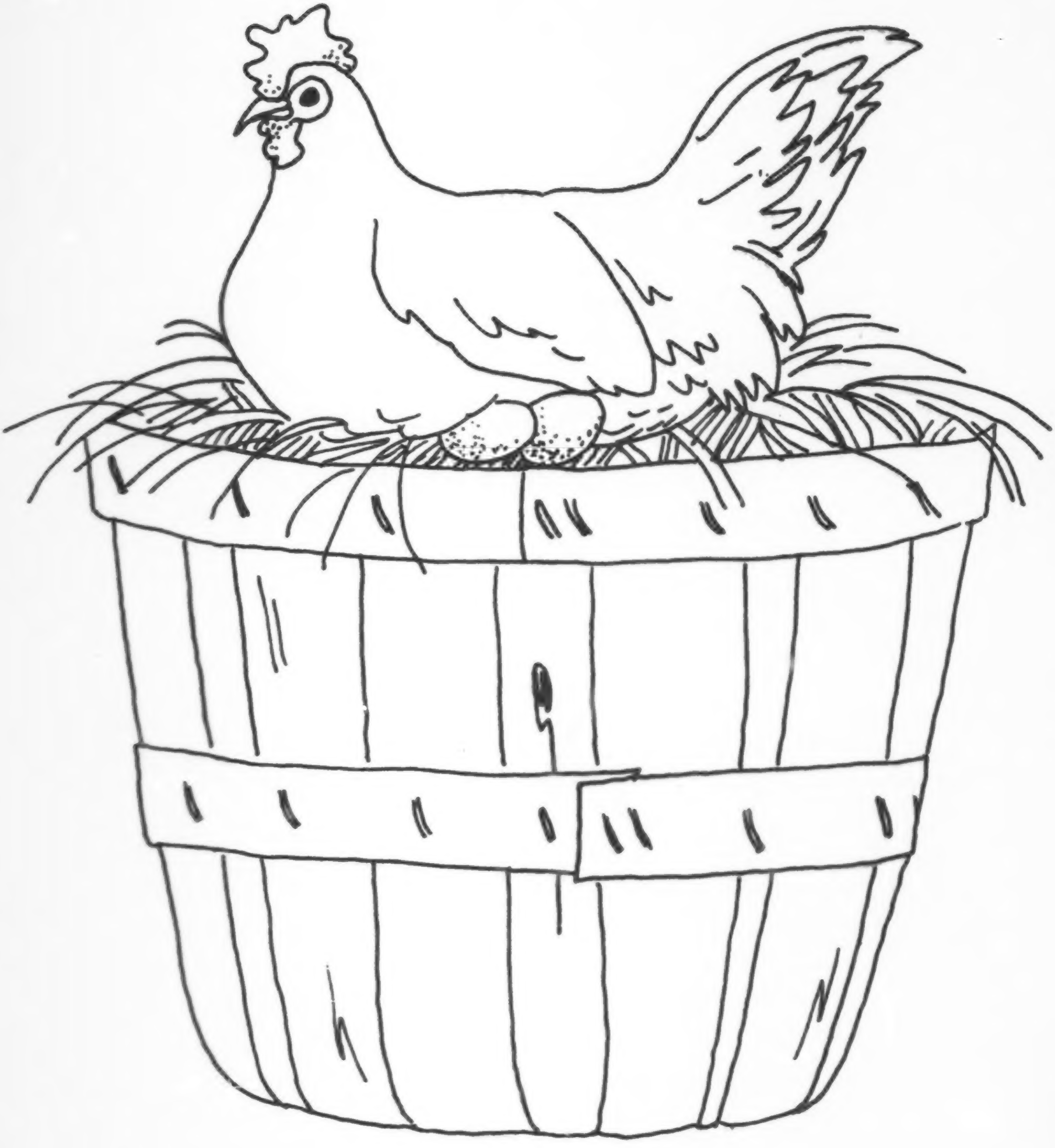
CHICKENS & TURKEYS

CHICK	SNOOD OR DEWBILL	CHICKEN COOP	TOMS	COMBS
ROOSTER	POULT	TURKEYS	WATTLE	FISHMEAL AND BONEMEAL
CARUNCLES	EGGS	PULLET	240	FOUR MONTHS
BRONZE	HATCHERIES	HEN	ENVIRONMENT	ANTIBIOTICS

POULTRY: CHICKENS and TURKEYS
(Definition Cards)

A chicken from hatching to eight weeks of age	Fleshy growth on the front of a turkey's head	Shed where chickens sleep and nest	Male turkeys	Chickens are the only bird that have these
Male chicken over 18 months old	A young turkey	Favorite bird of pioneer hunters	Pouchlike area in front of a turkey's throat	Help provide needed calcium and phosphorus to the chicken
Reddish growths of skin at the base of a turkey's throat	Raised and collected for food	Female chicken less than a year old	The average number of eggs laid by a hen each year	Average age turkeys are ready for market
Largest breed of domesticated turkeys	Produce baby chicks for sale	Adult female chicken	Turkeys require quiet living areas	Given to chicken to aid growth and protect against disease

POULTRY TASK CARD



POULTRY

1. Turkeys, unlike chickens, are raised on very few farms in North Dakota. They are raised basically for their nutritious and delicious meat. How many turkey producers do we have in our state?

(About three dozen commercial turkey producers)

2. Turkeys require some special considerations. They are easily "spooked", and should be raised in areas where there is little activity or noise. When frightened, turkeys will bunch together, sometimes crowding so close they can smother. What other things must be taken into consideration for young turkeys?

3. Turkeys are eaten all during the year, but are especially enjoyed (with all the "trimmings") on special holidays. Turkeys are fed concentrated foods and thus can grow to 25 pounds in five months. Have your friends ask their mothers what size turkey they purchase for Thanksgiving. Make a comparison to find out the average-sized turkey being served on that special day.

4. Create a book to "Gobble About", using these turkey-related words:

toms
wild turkeys
Bronze
domesticated turkeys
wattle
commercial
poult
Thanksgiving
hen
caruncles
snood

5. Research the seven varieties of domesticated turkeys living in America. Compare size and color. Find out which type of turkeys are raised in North Dakota.

6. In October of 1621, the Pilgrims held the first Thanksgiving in America. Chief Massasoit and his ninety Indians joined the Pilgrims for a three-day celebration. Research this historic event. Find out what foods were served and how they were prepared. How many of these could have been grown in North Dakota?

7. What if the Pilgrims' first Thanksgiving had taken place in our state? What would the Mandan, Hidatsa or Arikara Indians have served their White friends?

8. The turkeys we eat today are not the same as the wild birds eaten that first Thanksgiving. Our turkeys are domestic birds, raised on turkey farms. But the raising of domestic birds has been a difficult task for farmers. At first, no matter what was done, most birds could not eat and thus starved to death. Then, scientists discovered the reason for this. Young turkeys have poor eyesight and could not see the food on the ground. Turkey farmers now put the feed in raised feeders.

9. Chickens are something to "crow" about! Imagine a life without fried chicken, chicken salad, chicken noodle soup, barbecued chicken, fried eggs, egg salad. Can you continue the list of chicken-related items? Have a contest to see if you can list more than a friend.

10. North Dakota farmers raise chickens on their farms for both their personal use and for local sale of meat and eggs. Create a chicken-shaped dictionary, starting with such terms as...

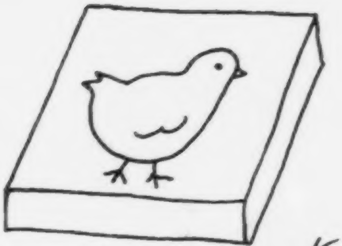
broiler
chicken coop
incubator
feathers
rooster
hatcheries
pullet
egg layers
hen
brood
chick

11. The Cando Egg Plant in Cando, N.D., is the largest egg-producing plant in the state. Listed below are some interesting facts about this plant...

- 160,000 chickens are used in the operation.
- 12.8 million pounds of feed are used per year. This is about 256 semi-truck loads.
- the feed consists of — corn, barley, soybeans, wheat, calcium, vitamins and minerals.
- the chickens drink 3.5 million gallons of water a year.
- each chicken lays an average of 1 egg per day.
- eggs are automatically collected on a conveyor belt, washed, "candled" (checked for bad eggs), sorted into size, and packaged.
- the eggs are sold to grocery stores, hospitals, schools, restaurants, and State institutions.

Draw a picture book showing the story of a North Dakota egg, from the chicken barn to your breakfast table.

PRINTED PACKS
(Language arts-Art activity)

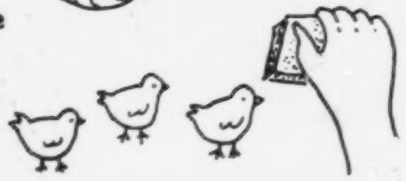


SUPPLIES: small wood blocks (about 5"x5")
string
glue
tempera paint
old sponge

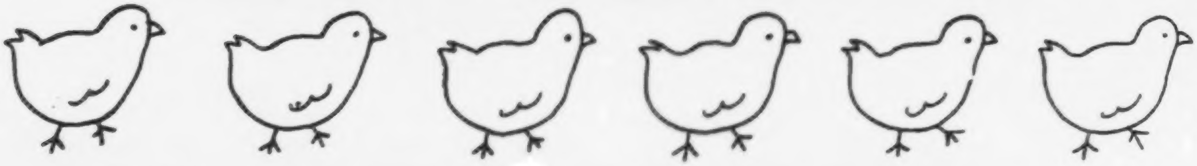
PROCEDURE:

1. Choose the animal to be illustrated. Draw it on the wooden block.

2. Using the glue bottle like a pen, outline the drawing; then press the string into the glue line. The animal has now been formed by a string line.

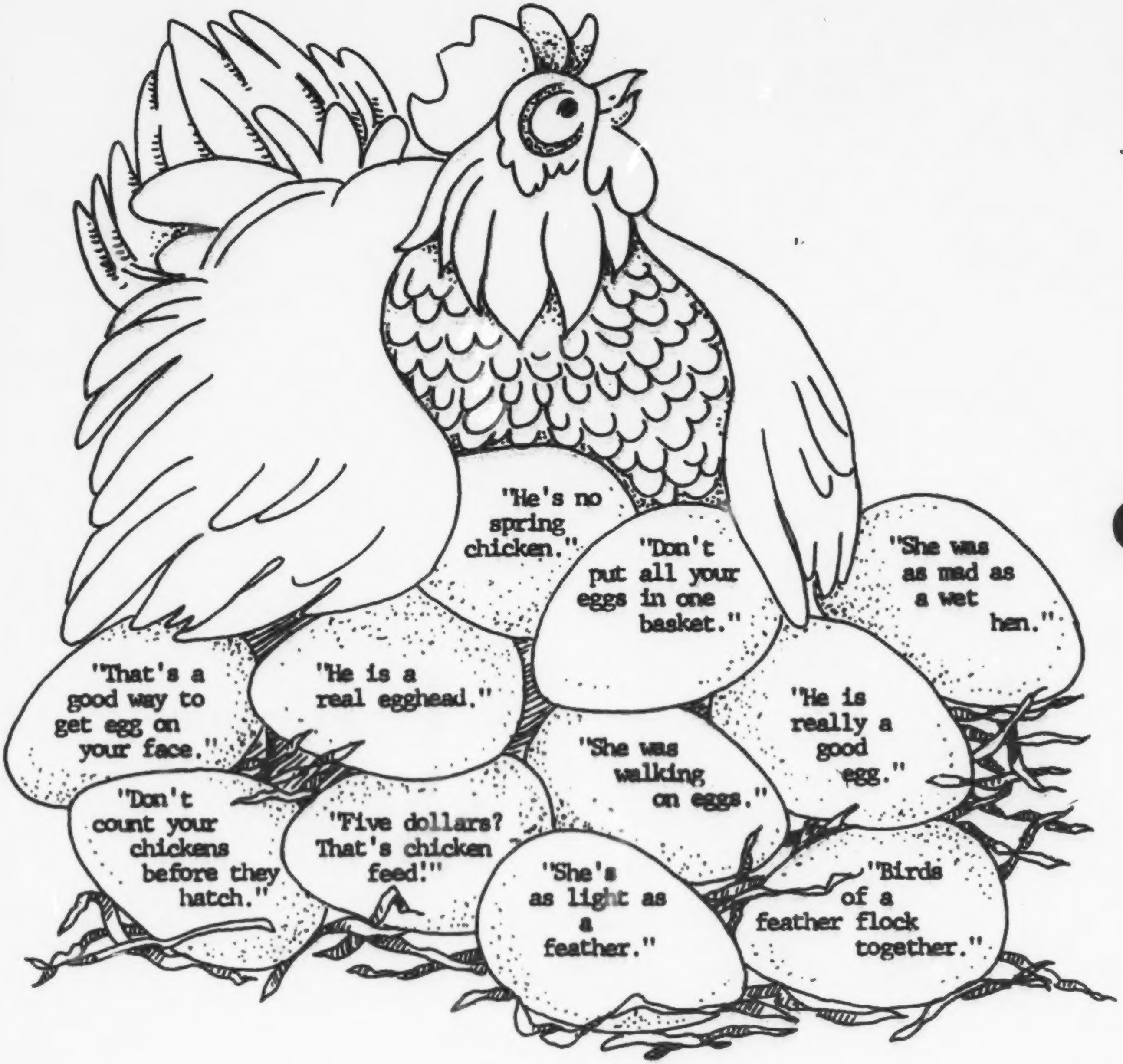


3. Let dry overnight.
4. Spread a tablespoon of tempera paint on the sponge. Press the string image on the wood block into the sponge. Now press onto paper; repeat until a pack, flock or herd has been created.



ANOTHER IDEA:
1) A background with a hen house, barn or other farm scene may be created first and then the printed animals may be added.
2) A farm mural can easily be created using the string prints.
On a large piece of butcher paper create a farm scene. A barn, house, hen house, fence, corral, windmill, trees and farm machinery are some of the items that may be included. Then each child can print several copies of their animal in an appropriate location on the mural.
3) These prints also can be used to decorate name tags, place mats, book covers, and more.

"EGGS-TRA" WORDS
(Bulletin Board Idea)


"He's no spring chicken."
"Don't put all your eggs in one basket."
"She was as mad as a wet hen."
"That's a good way to get egg on your face."
"He is a real egghead."
"He is really a good egg."
"She was walking on eggs."
"Don't count your chickens before they hatch."
"Five dollars? That's chicken feed!"
"She's as light as a feather."
"Birds of a feather flock together."

EGGS-TRA WORDS
(A study of cliches)

INTRODUCTION: The picture on the following page may be used on a center or on a bulletin board.

PROCEDURE:

1. Have the children recall as many cliches related to eggs and poultry as they possibly can.

2. Here are some examples to help you get started:

"Don't put all your eggs in one basket."
"She was as mad as a wet hen."
"He is really a good egg."
"He is a real egghead."
"She was walking on eggs."
"He's no spring chicken."
"That's a good way to get egg on your face."
"Don't count your chickens before they hatch."
"Five dollars?! That's chicken feed!"
"She's as light as a feather."
"Birds of a feather flock together."

3. Discuss the meaning of these cliches and then do a creative writing experience incorporating these expressions into your activity.

ANOTHER IDEA

Below are listed several other expressions which indirectly relate to farmlife. These could be used to expand upon the lesson.

-busy as a bee
-duck out of water
-gentle as a lamb
-green as grass
-high on the hog
-lock, stock, and barrel
-pull up stakes
-sing like a bird
-make hay while the sun shines

-cock and bull story
-fat as a pig
-go whole hog
-hand-to-mouth
-last straw
-pull the wool over...
-red as a beet
-save for a rainy day

-crow to pick
-feel one's oats
-goose hangs high
-hard row to hoe
-Mother Nature
-Old Sol
-strong as an ox
-steal one's thunder

1) Illustrate the cliche

2) Create a shape book of cliches and their meanings using the chicken-shaped task card.

3) Write a short chicken story using as many cliches as possible.

4) What are some cliches you use or have heard?

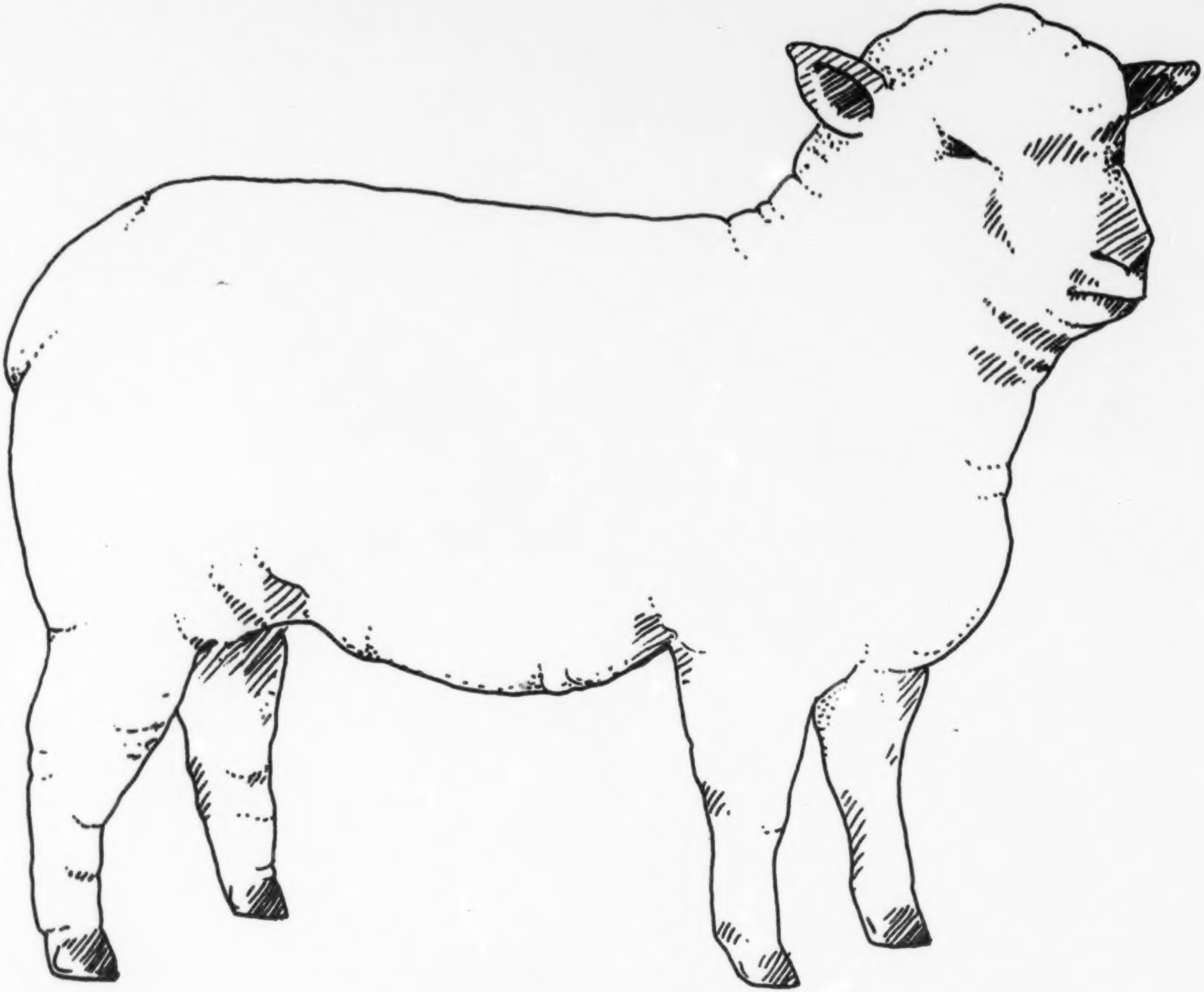
CLICHES are
expressions
that are worn
out from over
use.

SHEEP

EWE	LAMBING	RAM	WEEDS	WETHER
RUMINANT	MEAT AND WOOL	FLOCK	8000 YEARS OLD	SCALES
ROUGHAGE	MUTTON	SHEARING	LAMB	COYOTE
NINE POUNDS	WOOL	RUMINANT	SHEEP DOG	SHEEP SCAB

SHEEP
(Definition Cards)

Adult female sheep	The act of a sheep giving birth	Adult male sheep	A favorite food of sheep	Male sheep raised for market
Animals with a four part stomach	North Dakota sheep provide both food and clothing products	Group of sheep	The amount of time wool fibers have existed	Help keep wool fibers clean
90 % of the sheep's food	Meat from older sheep	The act of removing the wool from the sheep	Meat from young sheep	Enemy of sheep
Average amount of wool sheared from one sheep	Fibers of hair that sheep produce	A cud-chewing mammal	Type of dog developed to herd and watch sheep	Disease caused by mites and ticks



SHEEP TASK CARD

SHEEP

1. There are several similarities in the feeding and digestive processes of sheep and cattle. List and describe as many of the similarities as you can find.

(Four-part stomach for digestion; no upper front teeth--thick pad instead; front teeth on bottom jaw; large back teeth for grinding food; tear grass off by jerking head forward and upward; 90% of food eaten is roughage)

2. Sheep can get by on little water if necessary. In the desert, sheep can get enough moisture from just dew and snow! Explain how this attribute has helped the sheep to adapt to living on the North Dakota prairie.

3. Farmers say that sheep are better grazers than cattle. Because of narrower muzzles and thinner lips, the sheep's mouth moves more easily than cattle. Sheep also have a better sense of smell; therefore they choose only the plants they like instead of tearing off a clump of grass like cattle do. Some farmers and ranchers graze cattle and sheep together. What would be the benefit of doing this?

(Because they eat different things--cattle the tall grass; sheep the shorter finer grass, weeds, woody plants and shrubs)

4. Sheep are considered to be shy, timid animals. Why is this characteristic a benefit to the animal?

(It is a safety factor because sheep don't have teeth or claws or speed for protection)

5. Have you ever heard the expression "a little sheepish?" Explain what this figure of speech means and how it came to be.

6. Thousands of years ago, before sheep were tamed, they had two coats--a soft curly one covered with a long coarse coat. Why did farmers and ranchers start breeding sheep so that most of them today have the short curly coat?

(The curly coat made better cloth than the long coarse coat)

7. Sheep have special stomachs that allow them to digest coarse feed such as hay and silage. They are in the family of ruminants because of their four-part stomach. Name some other animals that are also ruminants.

(Cattle, goats, deer)

8. Wool fibers have an outer layer of tiny scales. If you examined them up close, the scales would look something like a pine cone. Explain how the scales of the wool fibers help the sheep as well as the fabric the fibers are made into later.

(Scales keep dirt away from the sheep's skin and help keep the clothes from getting dirty!)

9. Wool fibers have the ability to act as an "umbrella." The fibers are covered with a thin coating. Explain how the sheep is aided by this fact.

(Helps keep the wool dry when it rains)

10. The wool fibers look and act like coiled springs. When wool is pushed together it springs back. Crimps or waves in the fibers trap millions of tiny air pockets within the wool. How does this explain why wool garments are considered such warm clothing?

(The layer of air keeps out the cold)

11. Here are some interesting facts about sheep. Can you add to the list?

--Lambs are the only farm animals than can be raised for market on just their mother's milk and pasture grasses.

--Eighty percent of America's 12 million sheep are raised in 17 states.

--Flocks on the Western range number anywhere in size from 2,000 to 20,000.

--The top 5 sheep states are Texas, California, Wyoming, South Dakota and Colorado.

--Every state in the United States raises sheep.

--Sheep love to eat weeds.

--The average sheep's fleece weighs 8½ pounds.

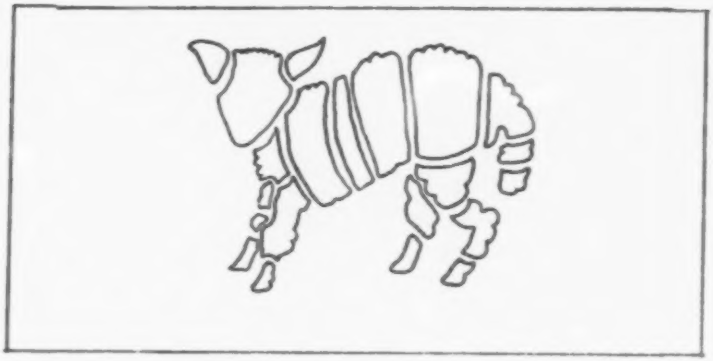
--A good shearer can shear 125 sheep a day.

--The amazing wool fiber is 8,000 years old.

CUT-APART ART
(Art project)

SUPPLIES:

- scissors
- white paper
- black paper
- black marker (fine point)

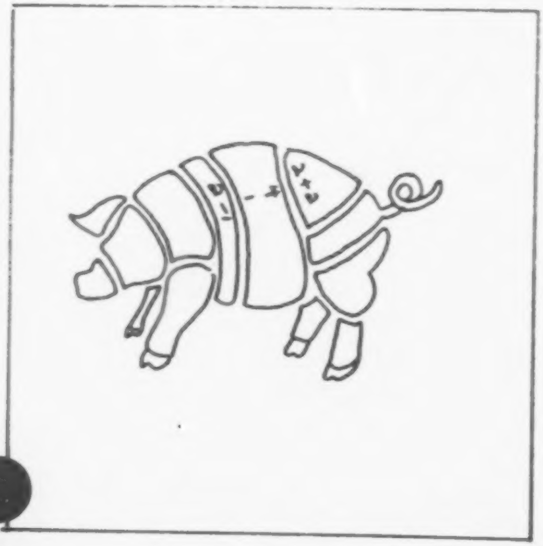


INTRODUCTION: This activity could be used with any of the livestock animals found in North Dakota today.

PROCEDURE:

1. Using pencil, draw a picture of a sheep on white paper. It may be realistic or imaginary.
2. Trace over the drawing with black marker.
3. Cut this drawing apart and reassemble on black paper leaving space between the parts.

ANOTHER IDEA: CUT-APART MATH ART is a fun and creative way to reinforce addition, subtraction, multiplication or division skills and art.



PROCEDURE:

1. Repeat steps one and two of CUT-APART ART.
2. Divide the sheep up like a puzzle.
3. Place math problems on the dividing lines. Placing the problem on one side of the line and the solution on the other, so that matching them will solve the puzzle.

ANIMAL STUDY
with a
COLOR CODED RESEARCH OUTLINE

SUPPLIES:

Animal Study
Color Code Outline
crayons or markers

INTRODUCTION:

Organizing facts is a difficult process for most students learning to research. The color coding procedure described here may help the students better organize their facts into a written report.

PROCEDURE:

1. Review the outline discussing the various topics and subtopics.

2. Using various reference books and encyclopedias research your animal, and try to locate facts in each of the five topic areas. Place the information on the paper as separate numbered facts. You may wish to have them skip lines between each fact.

3. Now you're ready to color code the outline. As a class, decide the color of each topic and color the cattlehead accordingly.

4. Once all the facts have been gathered, you are ready to color code your facts. For example a fact might be: Corn is an important food for hogs. (This fact would belong under topic II, WHAT DOES IT EAT. Suppose the color for topic II was RED, the child would place a red mark in front of this fact.

5. Continue "color coding" all of the other facts according to their topic color.

6. Once all the facts have been color coded the child groups the facts together according to their color. All the RED facts could become an interesting paragraph about what the animal looks like.

7. The facts for each topic (color) would then become its own paragraph.

8. Depending on the age and abilities of your researchers, the number of facts gathered will vary. Ambitious students may find they need to make more than one paragraph out of a particular topic (color).

9. Encourage your students to:
   - use complete sentences
   - spell correctly
   - punctuate appropriately
   - write with expression
   - encourage interjection of opinions
   - distinguish facts from feelings
   - make it interesting

ANIMAL STUDY
with a
COLOR CODED RESEARCH OUTLINE

I. WHAT DOES YOUR ANIMAL LOOK LIKE?

-color

-size

-shape

-length

-weight

-distinguishing features

-life span

-personality

-What other animal does it most resemble?

II. WHAT DOES IT EAT?

-How does it get its food?

-How often does it eat?

-Where does it get its food?

-What does its diet consist of?

-What place does it have in the food chain?

III. WHAT KIND OF ENVIRONMENT DOES IT LIVE IN?

-Use of its home

-What is its home made from?

-Do seasons alter its life style?

-What other region of the world does it prefer?

IV. IS THIS ANIMAL A FRIEND OR FOE?

-Who are its enemies?

-Who are its friends?

-Is this animal endangered by man?

-What kind of reputation does it have?

-Does any unique symbiotic relationship exist?

V. UNUSUAL OR UNIQUE CHARACTERISTICS

-strange habits

-myths and legends

-special adaptations

-true tales

POP-UP BOOKS

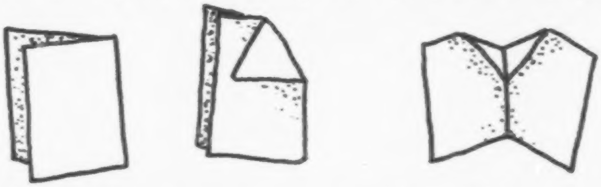
SUPPLIES: tag board, crayon, construction paper, markers

INTRODUCTION: Livestock production is second only to wheat in North Dakota's economy. You can easily see why when a comparison is made between the human and livestock populations. For every person in North Dakota, we have six livestock.

Create a pop-up book about a particular livestock animal in North Dakota and write a researched report or creative story to go with it.

PROCEDURE:

1. To create a "pop-up" book, a book where the image pops-out when the book is opened, take a piece of 9" by 12" construction paper and fold it in half.

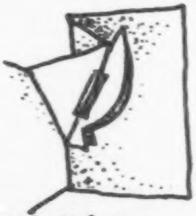


2. On the folded edge fold the top corner over so it meets the outer edge as illustrated.

3. Open and refold so that the corner is now on the inside.

4. Create the image of a North Dakota farm animal to be popped up using crayon, markers, paint or colored pencil.

5. Fold the image in half and glue or tape it to the center fold.



6. Place the pages into your book.

7. On the following page is a suggested list of North Dakota livestock. Students may choose from this list and/or add their own choice to it.

ANOTHER IDEA:

- Use to illustrate other research topics such as the members of the North Dakota Hall of Farm Fame, crops, machinery, etc.
- Create pop-up centers for your classroom.

POP-UP BOOKS continued

NORTH DAKOTA LIVESTOCK

SHEEP:

- Columbia
- Rambouillet
- Hampshire
- Suffolk
- Dorset
- Corriedale
- Southdowns
- Finn
- Shropshire
- Cheviots

TURKEY:

- Bourbon Red
- Bronze
- White Holland
- Black
- Slate
- Beltsville Small White
- Supplies

CHICKENS:

- Plymouth Rock
- Rhode Island Red
- New Hampshire
- Wyandotte
- Rhode Island White
- Buckeye
- Chanticler
- Delaware
- Dominique

BEEF CATTLE:

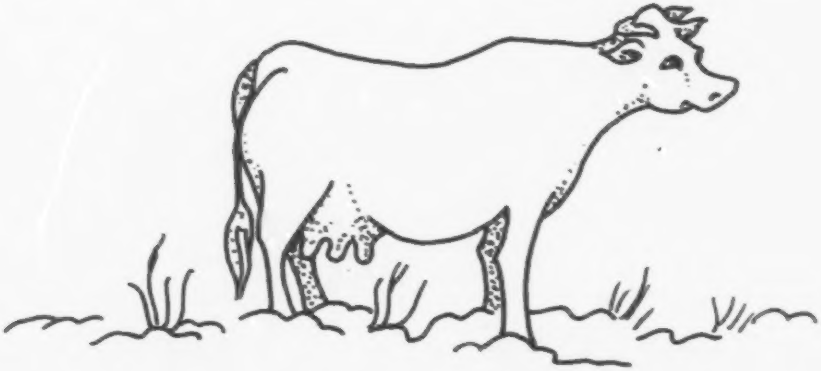
- Angus
- Shorthorn
- Hereford
- Red Angus
- Red Poll
- Brahman
- Brangus
- Polled Hereford
- Santa Gertrudis
- Charolais

PIG:

- Chester White
- Duroc
- Hampshire
- Poland China
- Yorkshire
- Spots
- Landrace
- Berkshire

DAIRY CATTLE:

- Holstein
- Guernsey
- Jersey
- Ayreshire
- Brown Swiss
- Milking Shorthorn
- Holstein-Friesian



LOOKING FOR THE LIVESTOCK
(Word game)

DIRECTIONS: Change one letter in each word to make the name of a farm-related animal found in North Dakota.

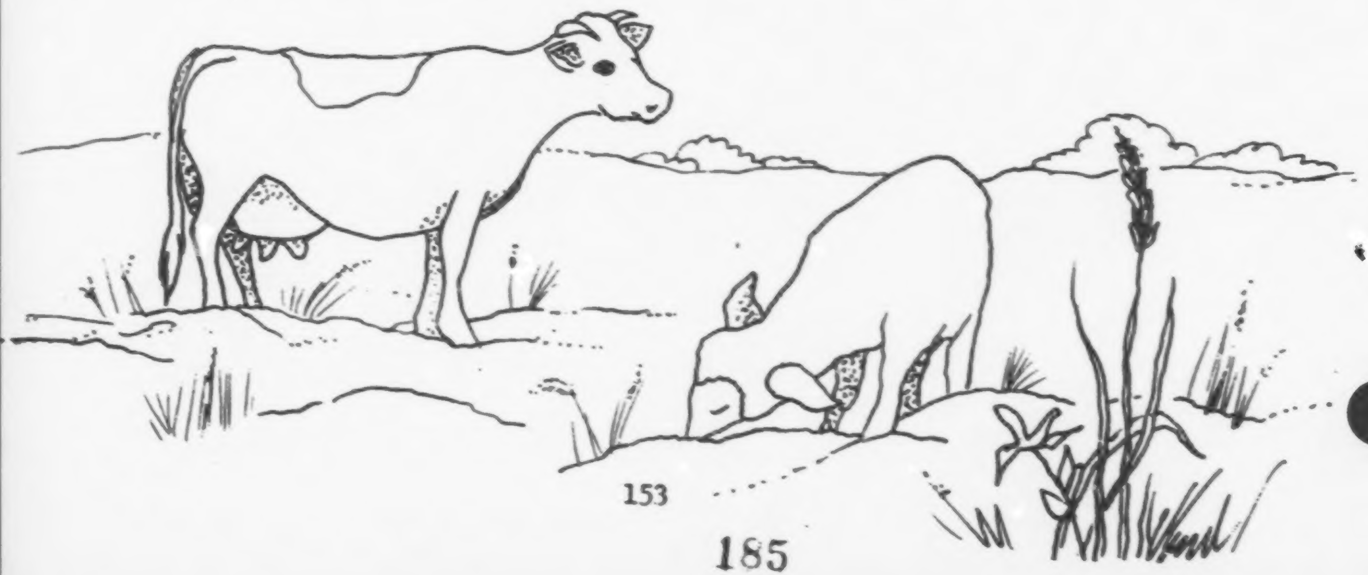
Example: h o w becomes c o w by changing the h to c.

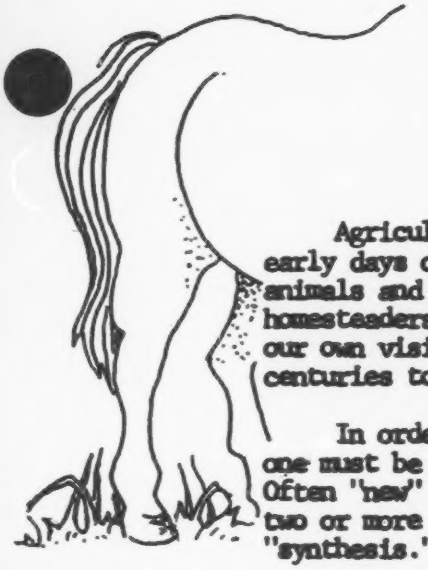
1. fig ____________
2. ball ____________
3. bat ____________
4. dish ____________
5. battle ____________
6. dock ____________
7. brow ____________
8. dear ____________
9. fog ____________
10. half ____________
11. form ____________
12. boat ____________
13. owe ____________
14. loose ____________
15. cold ____________
16. lame ____________
17. her ____________
18. steep ____________
19. beg ____________
20. lice ____________
21. shake ____________
22. booster ____________
23. murkey ____________
24. worse ____________

ANOTHER IDEA: Try your hand at making your own list of words for such things as North Dakota crops, farming and ranching equipment, etc.

Example: cheat becomes wheat

race becomes rake





SYNTHESIZED FARM ANIMALS
(Divergent-thinking project)

INTRODUCTION

Agriculture has come a long way since the early days of the settlers. Farms, ranches, animals and methods have changed beyond the homesteaders' wildest dreams. How far beyond our own vision will agriculture change in the centuries to come?

In order to change or improve something, one must be an imaginative and divergent thinker. Often "new" ideas have been created by combining two or more already known ideas. This is called "synthesis."

Take for example, the beefaloe, sometimes known as cattaloe. It is a cross between the American bison and ordinary domestic cattle. The beefaloe feed on grass like bison do and don't require the expensive grain feed that cattle need to be fattened with.

PROCEDURE:

1. Share the introduction with the class and discuss the term "synthesis."
   - A) What are some synthesized things used on a farm or ranch? (Combine, for example)
   - B) What are some other synthesized inventions or creations? (Moped-motorcycle/bicycle)
   - C) How has synthesis changed the farmers' life?
2. You are now going to use synthesis to create a "new" animal in the agricultural scene of North Dakota. Take two or more common animals and combine them into a new creature. Create a farm animal that is more versatile and better than the original animals.
3. Draw your synthesized creature.
4. Locate the Animal Research Outline guide in this book. Use the outline to help create a fictitious narrative about the new creation.

ANOTHER IDEA

After the class has completed their creations, why not make a barnyard scene complete with a suitable environment? Place the animals along with their narrative in their new home.

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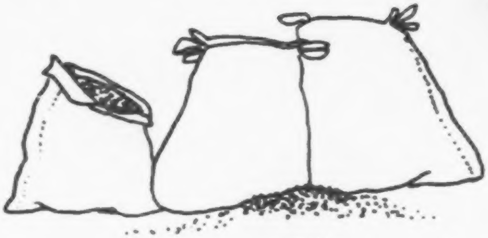
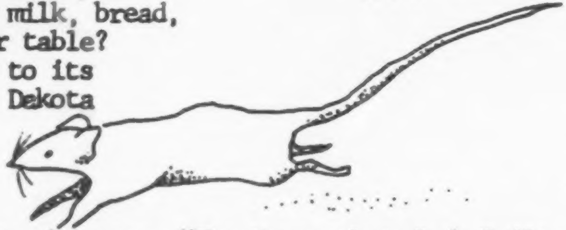
FOOD FOR THOUGHT
(Language arts activity)





SUPPLIES:

The poem, "The House that Jack Built"
List of crop and livestock products

INTRODUCTION:

Some "Food for Thought." Have you ever given thought to how milk, bread, or meat got to your dinner table? Trace a farm product back to its very beginning on a North Dakota farm or ranch.

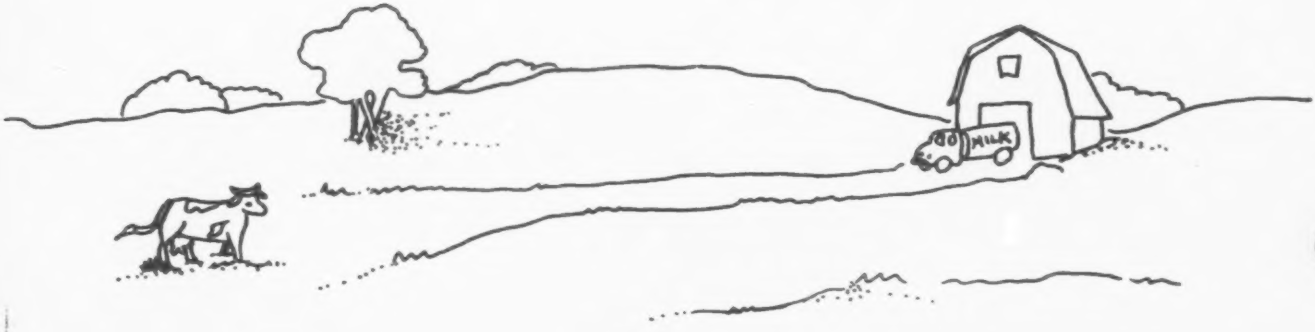
PROCEDURE:

1. Share with the students the poem, "The House that Jack Built."

2. Use this sample to get the students started in "webbing" several farm products of their own.

   "This is the farm that Max built.
   This is the dairy that gave money to Max for the farm that Max built.
   This is the barn on the dairy that gave the money to Max for the farm that Max built.
   This is the cow who lives in the barn on the dairy that gave the money to Max for the farm that Max built.
   This is the hay the cow eats who lives in the barn on the dairy that gave the money to Max for the farm that Max built.
   This is the farmer named Max who milks the cow that eats the hay who lives in the barn on the dairy that gave the money to Max for the farm that Max built."

3. Explain to the students the webbing tool that can be used in this kind of activity. Start with MILK and generate as many ideas as possible that are related to the product (milk).



CROP AND LIVESTOCK PRODUCTS
(To accompany Food For Thought)

This sheet may be used as you wish to help generate webbing ideas. Challenge your students to find additional items.

BEEF
hamburger
roast beef
T-bone steak
leather
liver
brains
tongue
kidneys
pharmaceuticals
(insulin)
margarine
gelatin
marshmallows
canned meat
candles
sausage casings
surgical sutures
soap
buttons
sports equipment
photo film
sandpaper
violin strings
explosives

DAIRY
milk
cheese
cottage cheese
cream
ice cream
sour cream
cheese dips
yogurt
butter
buttermilk

SHEEP
wool
leg of lamb
lamb chops
mutton

TURKEY
hotdogs
ham
bologna
Thanksgiving dinner

HOGS
ham
bacon
boar bristle brush
roast pork
picnic ham
lard
spare ribs
pork chops
leather
liver

CHICKEN
broilers
fryers
eggs
feather pillows
roasting chicken
stewing chicken
chicks

BEES
honey
comb honey
whipped honey
beeswax
POTATOES
french fries
potato chips
potato seed
gasohol
potato flakes
dehydrated potatoes

OATS
oatmeal
animal feed
gasohol
porridge
breakfast cereal
straw

BEANS (Navy, pinto, kidney)
baked beans
bean soup
oil

WHEAT
hamburger buns
bread
cinnamon rolls
gasohol
whole wheat flour
white flour
straw

DURUM
macaroni
spaghetti noodles
lasagne noodles
BARLEY
malting barley
animal feed
gasohol
barley soup
beer
straw
FLAX
linen
linseed oil
turpentine
paint

RYE
rye bread
hay
straw
whiskey

CORN
animal feed
gasohol
breakfast cereal
margarine
cooking oil

SUGARBEETS
sugar
gasohol
animal feed
molasses

THE STUDY OF HOW AND WHY STORIES
(Language Arts Activity)

SUPPLIES: The story, How the Whale Got Its Throat, by Rudyard Kipling
Creative writing story starters
STORY WRITING checklist

INTRODUCTION: Man has always wondered about his surroundings. There are three types of "how and why" stories:

1. Serious and mythical
2. Entertaining
3. Legendary explanation of a local phenomenon or geographic feature

PROCEDURE:

1. Listen to the story entitled, How the Whale Got Its Throat. Decide which of the three types this story fits.

2. Discuss the story and certain techniques the author uses.

3. Identify the parts of a good story by going over the STORY WRITING checklist found in this book.

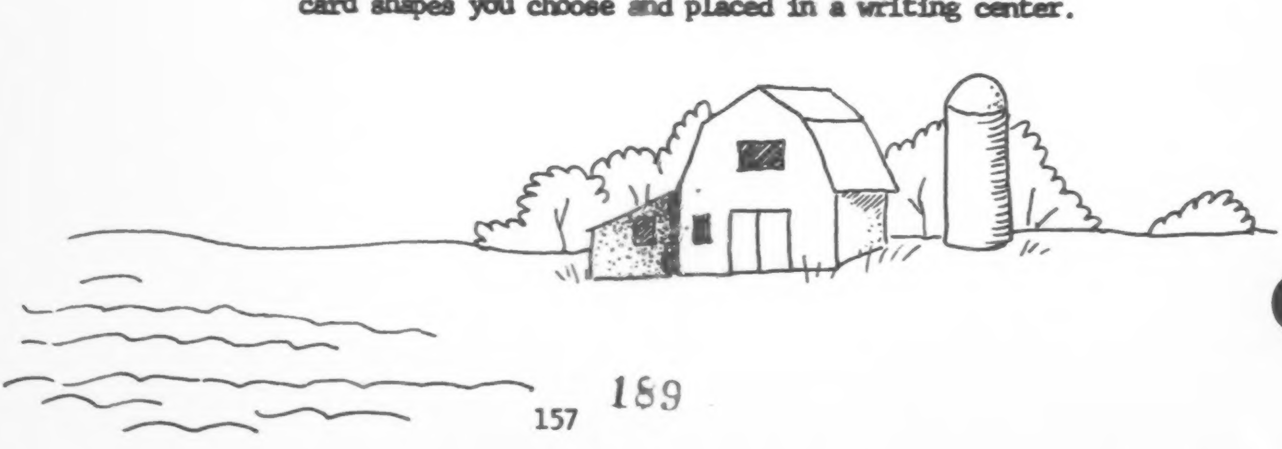
ANOTHER IDEA: Let's turn to the farm and write some of our own "how and why" stories. Don't be afraid to leave the barnyard and plow other ground. Brainstorm several titles for our "farm tales."

-Choose a title that interests you.

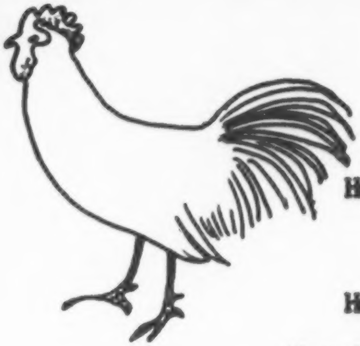
-Now that you've chosen a title, plow on and write your own story.

-Again make reference to the STORY WRITING checklist as the students begin to construct their own story elements.

-On the following page are some titles to help you get started. Several of these could be mounted on any task card shapes you choose and placed in a writing center.



THE STUDY OF HOW AND WHY STORIES CONTINUED



Some Title Suggestions

How did the turkey get its gobble?

How did the pig get its oink?

How did the chicken get its cluck?

Why does the Polled Hereford have no horns?

How did the steer get its horns?

Where did the bee get its sting?

Where did the sheep get its wool?

Why are sugar beets red?

Why are sugar beets sweet?

Where did the potatoes get their eyes?

Why do potatoes grow underground?

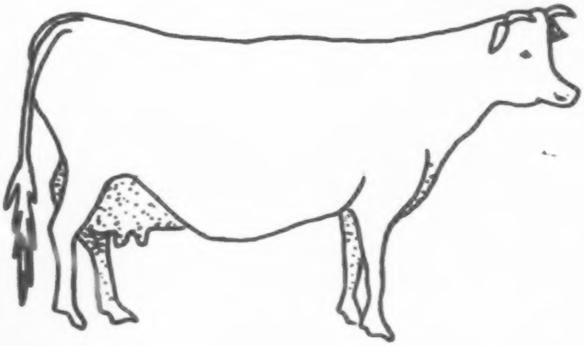
Where did the sunflower get its seed?

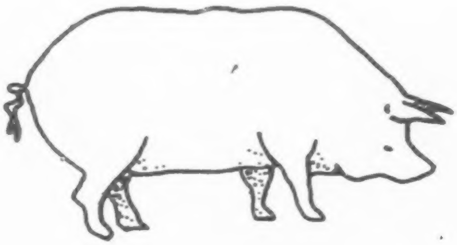
Why does the sunflower turn towards the sun?

Why are flax fields blue or white?

Why do the wheat fields turn golden in the fall?

Where did alfafa get its scent?





BARLEY 'N FLAX

NO. 1	MALT BARLEY	EASTERN NORTH DAKOTA	HOGS SHEEP CATTLE	BLUE
PAINTS, VARNISHES, SOAPS, PRINTING INK	LIVESTOCK FEED	WEED PREVENTION	CANADA, RUSSIA, INDIA, UNITED STATES	POT BARLEY
NORTH DAKOTA CLIMATE	CEREAL GRAIN	PAPER	FEED BARLEY	ONE TO FOUR FEET HIGH
PEARLED BARLEY	ROPE LINEN LACE	BARLEY-18,000 YEARS OLD	LINSEED OIL	PIONEERS

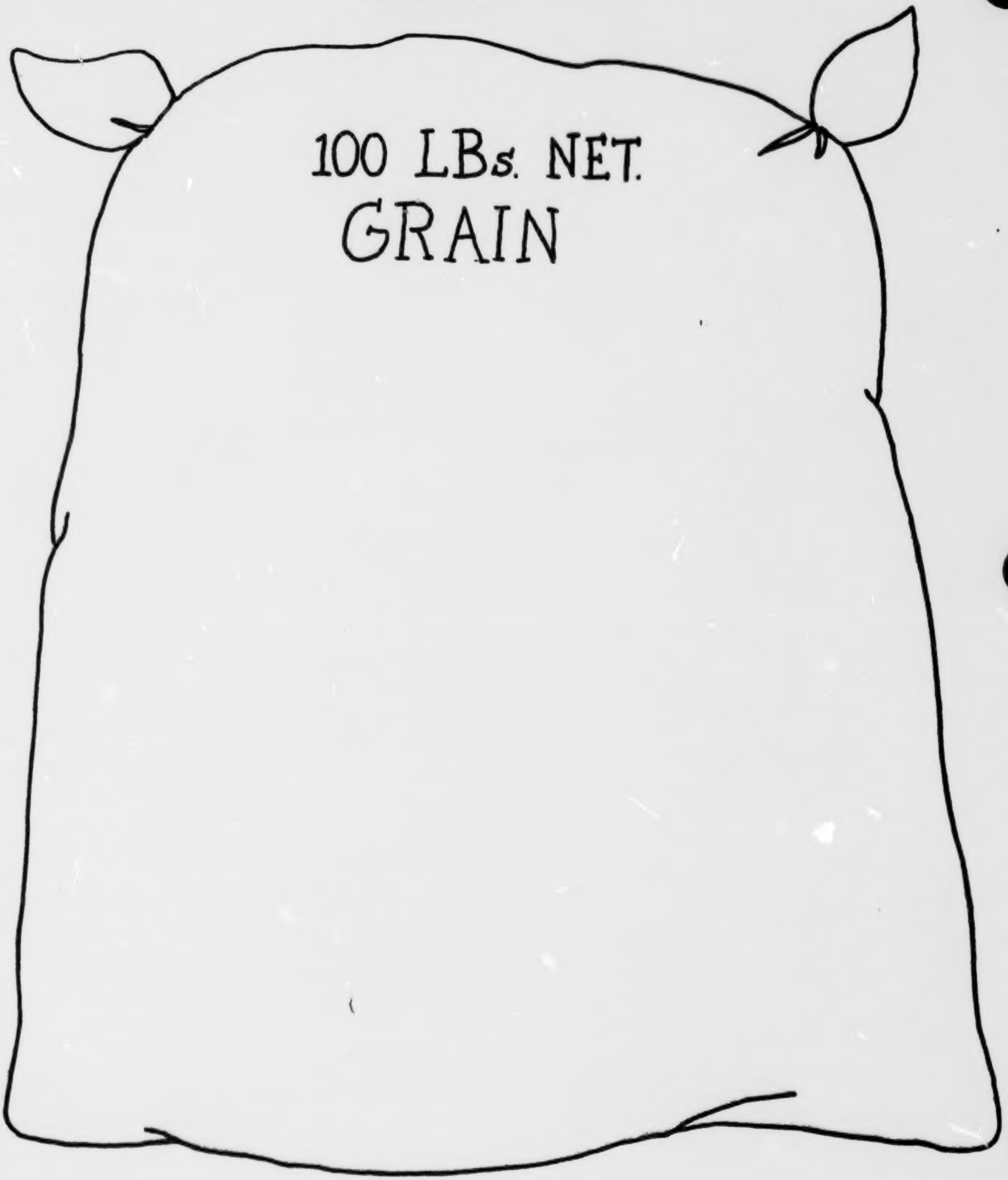
BARLEY and FLAX
(Definition Cards)

The North Dakota Barley Council has prepared a brochure called, "Barley—The World's Oldest Crop, Feeds a Modern World". This is designed for the 4th and 5th grade levels and multiple copies can be obtained by writing to The North Dakota Barley Council, 415 38th St. S.W., Fargo, ND 58103.

North Dakota's rank in the U.S. production of barley and flax	Used for making beer, malted milk, and cereal	Primary area of barley production in the state	Barley is part of their diet	Color of North Dakota flax in bloom
Some products of linseed oil	Use of flax after oil is removed from the seed called meal	Barley crop helps to eliminate weeds in the field	Leaders in flax seed production	Ground just enough to remove the husk
Cool dry climate of North Dakota prevents flax diseases	Barley is the fourth most important cereal grain	Made from stalk fibers of flax	Used to feed livestock	Flax plant
Ground until husk and germ are removed	Spun from flax fibers	Possibly the first cereal grain eaten by man.	Major product of flax	Often planted flax as the first crop out west

GRAIN TASK CARD

(Barley, Oats, Flax, Rye)


100 LBs. NET.
GRAIN

BARLEY-WHEATS LOOK ALIKE

1. North Dakota ranks number one in the United States for the production of barley! What other states are major producers of barley?
(Montana, Idaho, Washington, Minnesota and California.)
What are some of the leading barley producing countries of the world?

(Russia, Canada, U.S., Australia and France.)

2. North Dakota grows two types of barley. What are these two types and what are their uses?

(Malting barley--beer, malted milk, cereal; feed barley--livestock)

3. Wheat and barley look a lot alike. What are the similarities and differences between the two crops?

(Barley has a bearded head like wheat and turns golden in the fall; the kernel is yellow and red in hard red spring wheat; durum is more amber in color. Spring wheat and barley plants are about the same in height; durum is usually longer. Husks on wheat and durum are threshed off. The barley husk adheres to the kernel.

4. North Dakota raises barley primarily in what part of the state?

(Eastern)

5. Barley grown in North Dakota is either sold on the market or fed to livestock. What are some animals that eat feed barley?
How is feed barley prepared?

(Hogs, sheep, cattle; Grains are ground by a grinder or roller mill)

6. The amount of barley grown in North Dakota has increased over the years. Give two reasons why.

(Malting demands, farm programs and farmers looking for alternative crops.)

7. Barley made into malt is used to help make beer, breakfast cereal, and malted milk. Read about the process by which malt is made from barley. Make an interesting poster explaining the process.

(Grains are softened, moistened, then germinated. After germination, grains are dried and sprouts are removed. Remaining grain is called "malt".)

8. Barley ranks as the fourth most important cereal grain in the world. What are the other top three cereal grains?

(#1 is wheat, #2 is rice, #3 is corn)

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BARLEY Task Cards continued

9. Barley has been found in ruins dating back 18,000 years ago. Columbus brought barley to the New World. Babylonians used barley as money in ancient times.

10. Find out what has been done to the grains to make pearled barley.

(Pot barley is ground just enough to remove the husk. Pearled barley is ground until the husk and germ are removed)

11. The Bible mentions barley several times. Find as many scriptures as possible which refer to barley.

(II Samuel 17:28, II Chronicles 2:9, Leviticus 23:9-15, Ruth 1:22 to mention a few.)

12. The number of pounds of barley grown in North Dakota in 1984 is 7,377,600. If a bushel of barley weighs 48 pounds, how many bushels were produced? How many metric ton?

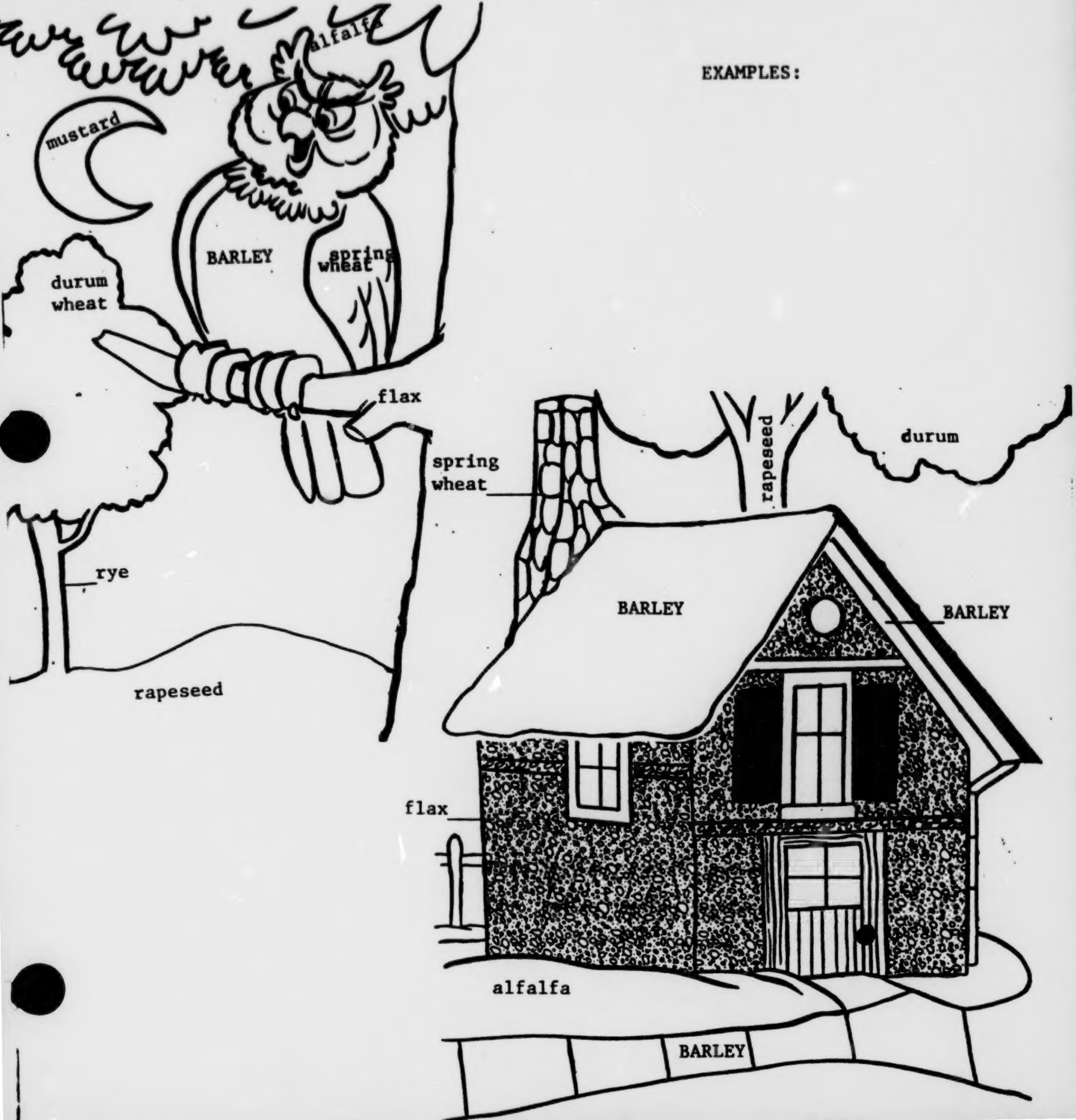
(2,204 lbs./MT) (153,700,000 bushels; 3,347,368 MT)

NEW EDITIONS:

GRAIN MOSAICS

Using barley kernels (commercial food barley may be used), wheat, rye, flax, rice, etc., create a picture or modern art design. Draw your idea on heavy paper or cardboard. Cover a small section at a time with white glue and press the grain into the glue.

EXAMPLES:


alfalfa
mustard
BARLEY
spring wheat
durum wheat
flax
rye
rapeseed
spring wheat
rapeseed
durum
BARLEY
BARLEY
flax
alfalfa
BARLEY

Page, 163b:

NEWSPAPER ARTICLE

Pretend you are an agricultural writer for a newspaper. Your assignment is to investigate the importance of barley on the economy of North Dakota. Make your article at least 300 words long using the following words in the story:

barley, ancient, grain, animal food, beer, North Dakota, soup, nutritious, pearled, exported, acres, economy, production.

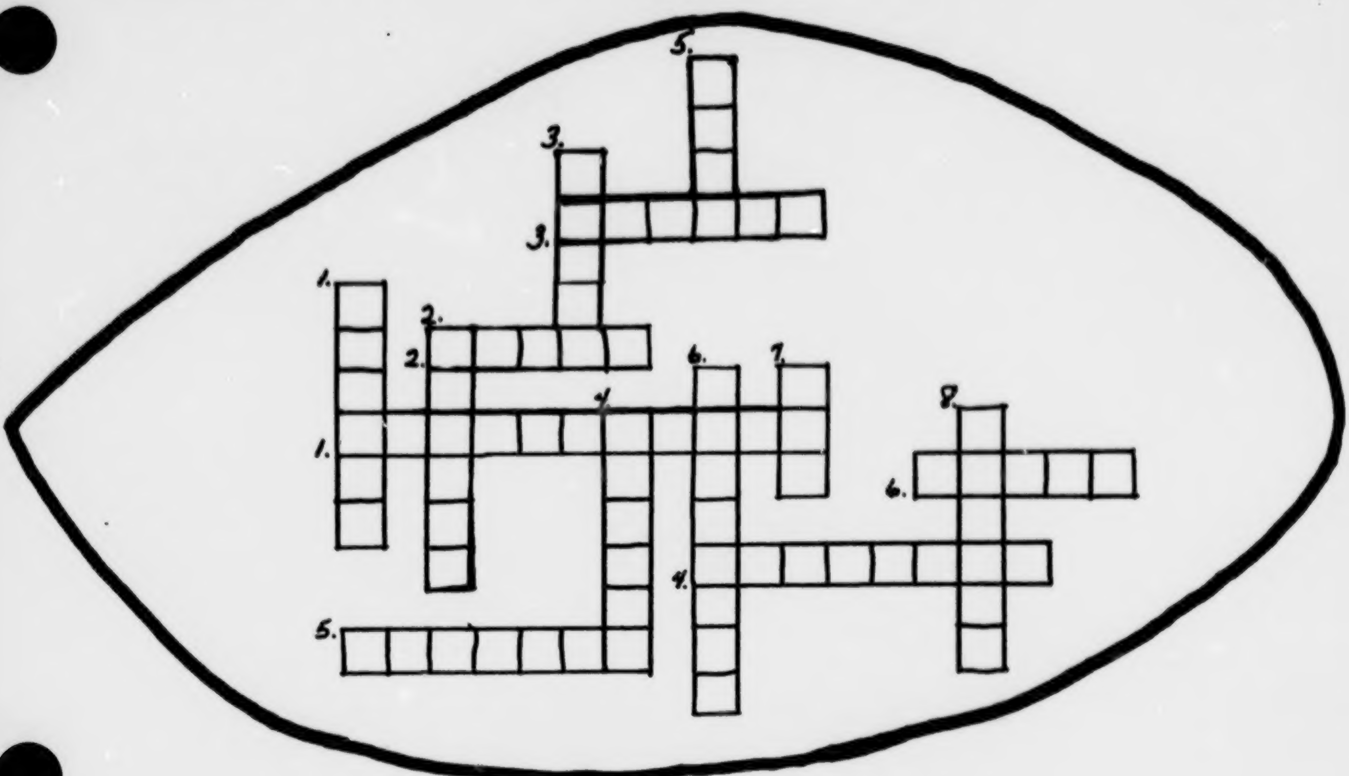
BACKWARDS BARLEY

Put these words in alphabetical order using only the LAST letter (or letters) of each word:

	Answer
ancient	food
barley	cereal
grain	bushel
kernel	kernel
cereal	grain
crop	crop
elevators	farmer
bushel	flour
farmer	elevators
nutritious	nutritious
[illegible]our	ancient
[illegible]od	barley

163c:

BARLEY PUZZLE



ACROSS:

1. State which produces the most barley (NORTH DAKOTA)
2. The book which tells of barley in ancient times (BIBLE)
3. The EMBRYO contains the best protein in a barley kernel
4. Seeds need MOISTURE in order to sprout
5. The North Dakota Barley COUNCIL was started in 1983
6. Barley was used for MONEY in ancient Babylonia

DOWN:

1. A grain of barley is called a KERNEL
2. The world's oldest known grain (BARLEY)
3. PEARL barley contains only the endosperm
4. Most barley is used for ANIMAL feed
5. The main use for malting barley is to make BEER
6. COLUMBUS first brought barley to the New World
7. Barley is usually planted in North Dakota in the month of MAY
8. Barley is the FOURTH largest cereal crop in the world

Clues to this puzzle are found in the brochure "Barley--The World's Oldest Crop, Feeds a Modern World". To obtain multiple copies of this brochure, write to The North Dakota Barley Council, 415 38th St. S.W., Fargo, ND 58103.

BLOOMING BLUE FLAX

1. North Dakota ranks number one in the production of flaxseed in the United States! Why is North Dakota well suited to the raising of flax?

(It's best suited in a warm humid climate but is affected by diseases there, so North Dakota's cooler, drier climate is more ideal).

2. Flax is mostly used to make linseed oil. What are some important things made from the linseed oil?

(Paints, varnishes, soaps, linoleum, patent leather, printing ink, oilcloth)

3. The material left after linseed oil has been made from flax is used for what purpose?

(Animal feed)

4. It seems like every part of a flax plant has a useful purpose. What is the straw or stalk fiber of the plant used for after the seeds have been removed?

(Fibers in the straw make linen cloth, paper, rope, lace)

5. A North Dakota field of flax in full bloom is a beautiful sight. What color is it?
There are many other species of flax plants and colors. Some people raise them for their beautiful color. Find out what some of the other colors are in their flowers.

(Blue; bright red, yellow, white, pink)

6. North Dakota grows flax primarily for seed to make oil but other parts of the world raise flax for fiber. What country in the world produces the most fiber flax?

(Russia)

7. Canada, Russia, India and the United States are leaders in flaxseed production. North Dakota and South Dakota supply most of the flaxseed for the United States, but some must still be imported to meet the demands.

8. The United States has never produced large amounts of fiber flax. The invention of the cotton gin by Eli Whitney in 1793 has a major influence on this fact. Explain why.

(The cotton gin made cotton yarn more economical than linen yarn from flax)

FLAX Task Cards continued

9. Read about the processing of fiber flax in the encyclopedia. There are many steps involved in the process, and special vocabulary words to describe each phase. How many of these terms can you find and define? Make a miniature book of these words and the steps involved. Include some mini-illustrations.

RIPPLING
RETTING
DEW RETTING
BREAKING
TOW
SHIVES
LINE
HACKLING
SCUTCHING

10. Some developments in the mid-1900s decreased the demands for flax fiber and flaxseed. Read about the uses of both flax fiber and seed. What developments do you think might have decreased the need for flax?

(Development of nylon, polyester, and use of latex paints instead of oil-based paints)

HAY

1. Hay is livestock food made from dried stems and leaves of different plants. What are some plants used to make hay?

(Timothy, bluegrass, redtop, or wild prairie grasses; also clover, alfalfa, rye, barley and oats)

2. Name some of the livestock that are fed on hay.

(Horses, cattle, sheep)

3. Alfalfa and clover hay do not need to be replanted each year. Explain why.

(The roots stay alive during the winter sending up new green plants in the spring)

4. Farmers cut hay and place it in rows. What types of equipment might be used to do the job?

(Mower, rake, or swather)

5. What are windrows and what purpose do they serve?

(Hay is cut into rows called windrows and left to dry, often for days, before being stacked or baled)

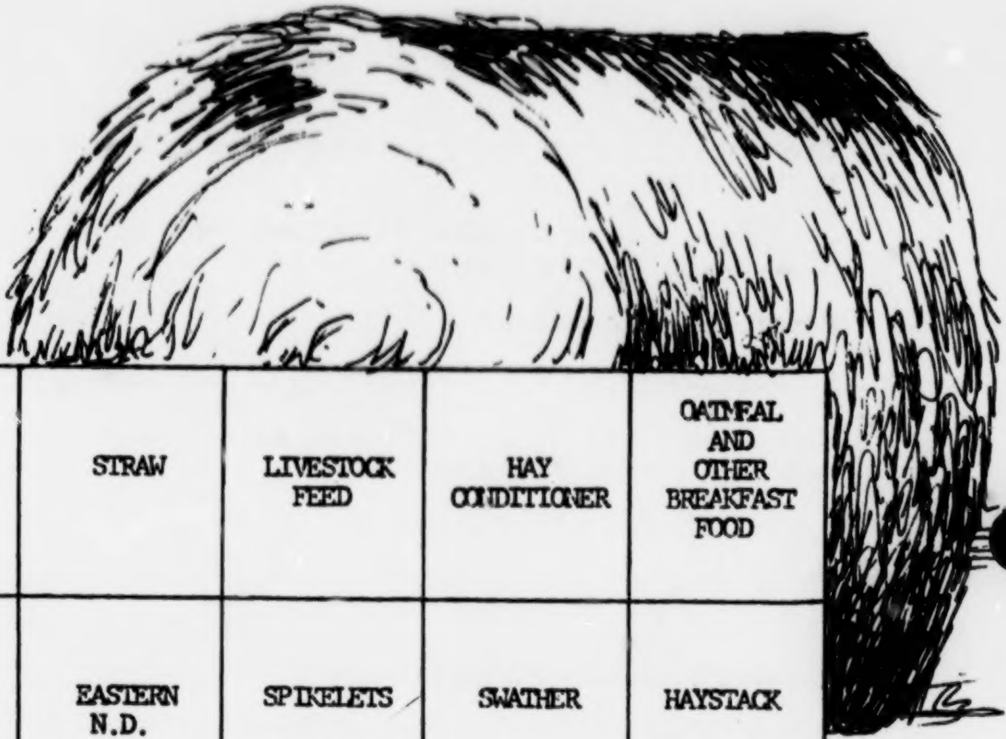
6. Explain what a baler is and what it does.

(It is a special machine that picks up hay, packs it, and ties it with twine in either square or round bales)

7. When do farmers cut hay?

(Between June and the first killing frost in the fall.)

HAY & OATS



OATS	STRAW	LIVESTOCK FEED	HAY CONDITIONER	OATMEAL AND OTHER BREAKFAST FOOD
WINDROWS	EASTERN N.D.	SPIKELETS	SWATHER	HAYSTACK
GRAMINEAE	BALES	HAYLOFT	PILCORN	METIS INDIANS
OATS NUTRIENTS	CANVAS	ALFALFA AND CLOVER	TEMPERATE ZONE	HAY

OATS and HAY
(Definition Card)

most important grain for horses	the remaining parts of hay and oats after threshing	oats	used to speed drying of hay	made from oats
rows of drying cut hay	region of state where most of the oats are grown	slender branches of an oat stalk	machine to cut hay	stacked hay
the grass family to which oats belongs	hay bound with twine in square or round bundles	hay storage area in a barn	oats grown in England during the 1200's	planted oats in the Red River Valley
starch and proteins	covers and protects hay stored outside	two plants grown for hay	climate in which N.D. oats is raised	livestock food made of driest grass stems and leaves

OATS

1. Oats is not necessarily an important cash crop for North Dakota. What is the major use of oats?

(feed for livestock and cereal food)

2. The importance of strong healthy work horses made oats an important crop in the past. Today, with horses being replaced by machines, one would think the demand for oats has decreased but actually the production has increased. Explain why this is true.

(It is used for human consumption as well as for livestock)

3. What are some foods made from oat grains?

(Oatmeal and prepared breakfast food)

4. The greatest amount of oats is grown in what part of our state?

(Eastern North Dakota)

5. Find out what pilcorn was.

(The name of oats grown in England during the 1200s)

6. Oats is the best grain for horses. What makes oats such a nourishing food for both livestock and man?

(Rich in starch, proteins and carbohydrates)

RYE

1. What is the primary use of rye?

(Grown for livestock food)

2. How much of the rye plant is used as food for livestock?

(The grain or entire plant can be fed to the animals)

3. Besides feed for livestock, what other uses are there for rye?

(Flour for bread, grains for alcoholic beverages, especially whiskey)

4. A majority of the rye raised in North Dakota is of a winter variety. What is winter rye?

(It is planted in the fall of the year and harvested in early summer)

5. Rye grain is used in making flour for bread. Why does that make rye so important?

(Rye along with wheat are the only two grains that can be baked into loaves)

6. The straw of a rye plant is a raw material for what important product?

(Paper)

7. Find out what is meant by "cover crop." How does it help the farmer?

(It is a crop grown alternately with other crops to protect the soil)

8. Breads of Europe are often made of rye. Describe the ways in which rye bread is different than wheat bread.

(Heavier, darker bread; less gluten, therefore doesn't rise as easily as wheat bread)

9. Rye is similar in looks to what other two important cereal grains grown in North Dakota?

(Wheat and barley)

10. What characteristic makes rye different from other cereal grains such as wheat, oats and barley? It also makes it difficult to keep pure varieties of rye.

(Rye flowers open up for pollination and shed a shower of pollen at blossom time)

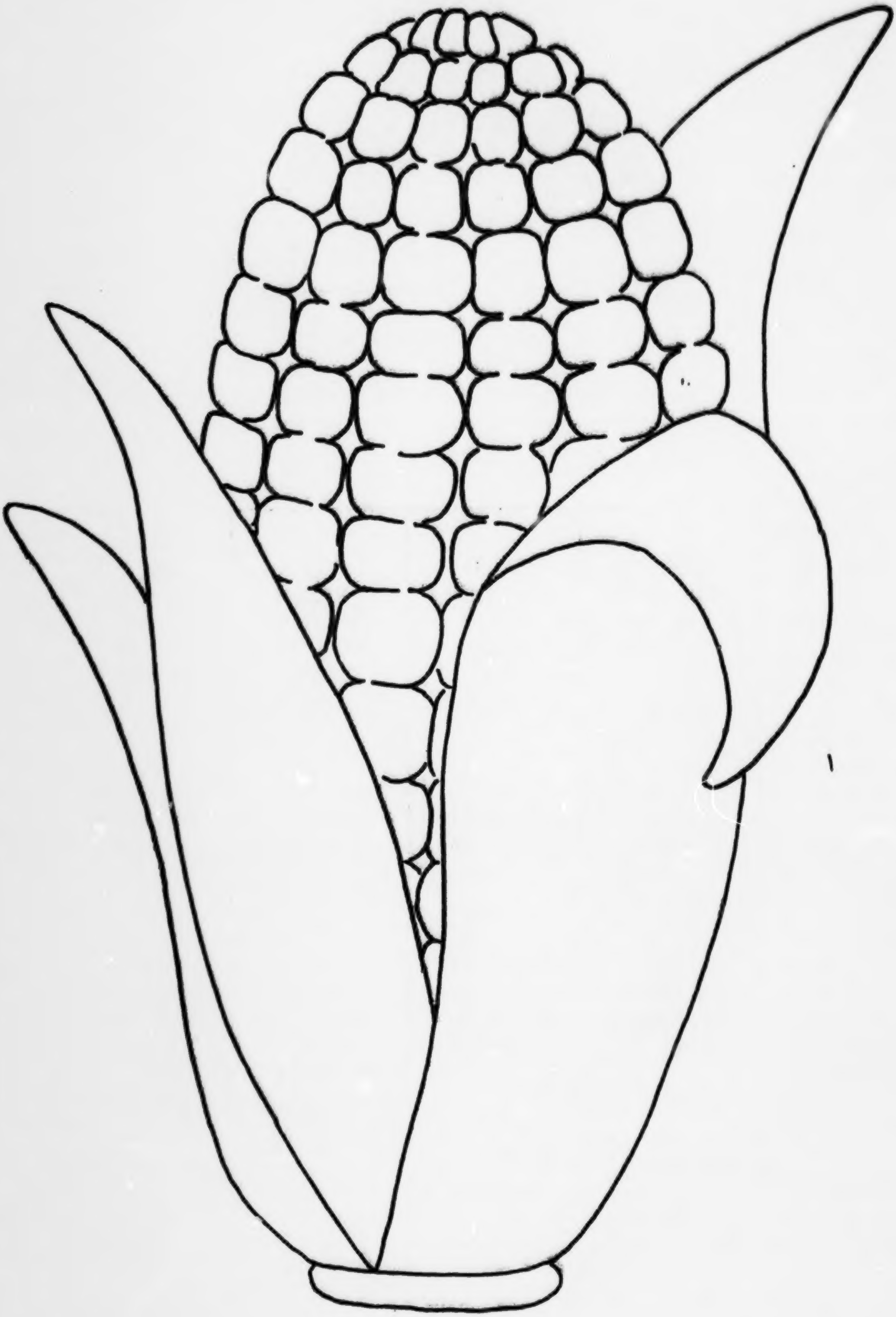
RYE & CORN

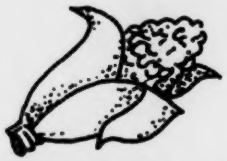
RYE	CORN PRODUCTION	POLLINATION	FATS PROTEINS CARBOHYDRATES	RYE BREAD
"HOGGED OFF"	DEXTROSE	RYE PRODUCTS	COLUMBUS	PAPER
RYE AND WHEAT	SILAGE	EASTERN N.D.	COVER CROP	HOGS CATTLE SHEEP POULTRY
DAIRY COWS	CORN PRODUCTS	WINTER VARIETY	TASSEL	RYE BARLEY WHEAT

RYE and CORN
(Definition Cards)

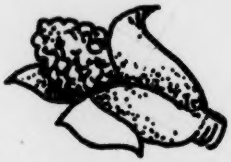
A grain grown for livestock and human food	Closely related to hog and cattle raising	Rye is the only cereal grain that pollinates	Rich nutrients found in corn	Heavy, dark, less gluten in bread
Hogs and cattle feeding on corn in the field	Refined corn sugar	Flour, alcoholic beverages	Introduced corn to Europe	Made from the straw of rye
The only two grains that can be used for making bread	Corn cut green and stored in silos	Area of state best suited for raising corn	Rye is alternately grown with other crops to protect the soil	Corn is one of their most important food
Depend on corn for rich milk	Margarine, popcorn, cooking oil, corn flour and meal	Primary type of rye grown in N.D.	Grows at the top of a cornstalk	Three important cereal grains grown in N.D.

CORN TASK CARD





CORN



1. The major use of corn grown in North Dakota is for livestock feed. Smaller amounts of corn may be used for what other purposes?

(food for people, oils)

2. Why is corn an important food for dairy cows?

(Helps produce more and richer milk)

3. What is silage?

(Corn cut green and stored in silos for winter livestock feed)

4. Corn requires a fairly long growing season. What part of the state is best suited to the growing of corn?

(Southeastern corner of the state)

5. What does the expression, "hogged off" mean?

(It is when hogs and cattle are allowed to feed directly on the corn stalks in the field)

6. About four-fifths of the United States' corn grown each year is fed to livestock. What are some animals of the farm that are fed on corn?

(Hogs, cattle, sheep, poultry)

7. Corn production is closely related to hog and cattle raising. Explain why.

(These animals depend mostly on corn for food)

8. It has been said that, in one way or another, corn makes up more of our diet than any other farm crop. Explain why this might be so.

(Many kinds of food are made from corn kernels. Corn also provides food indirectly--meat and meat products from animals raised on corn)

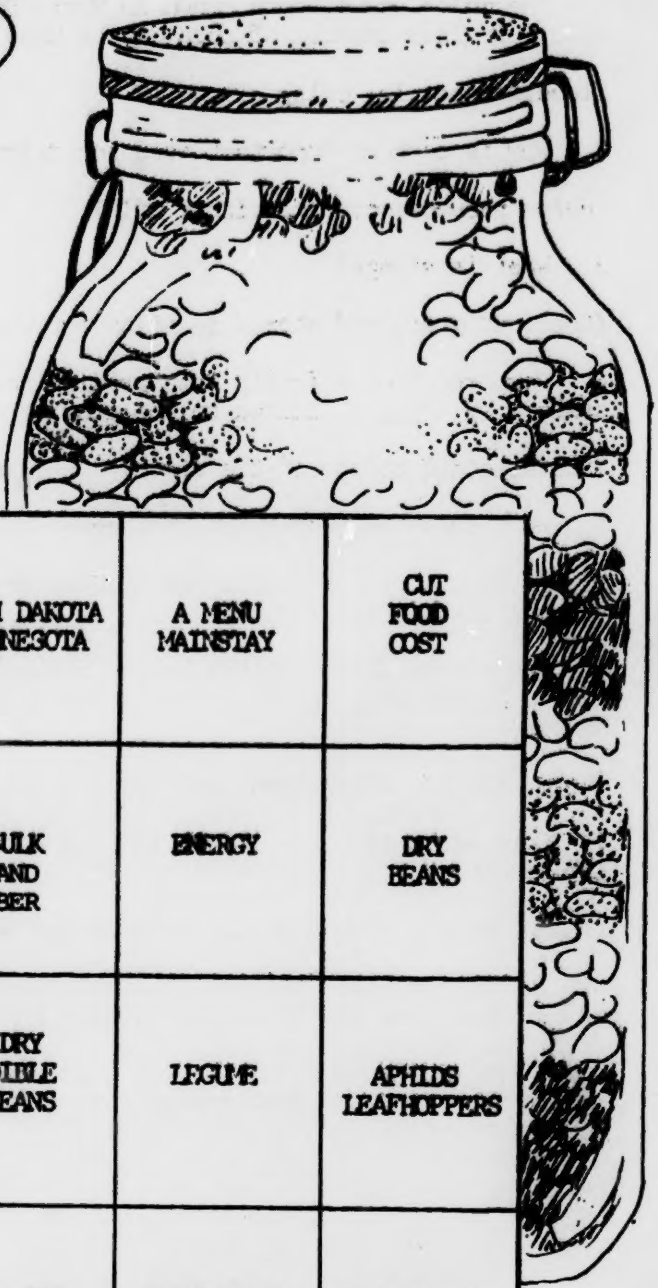
9. Corn has a high food value. What are some of the rich nutrients contained in corn?

(Fats, proteins, carbohydrates)

10. Who introduced corn to Europe?

(Columbus brought it back to Europe from the New World in 1492)

EDIBLE BEANS

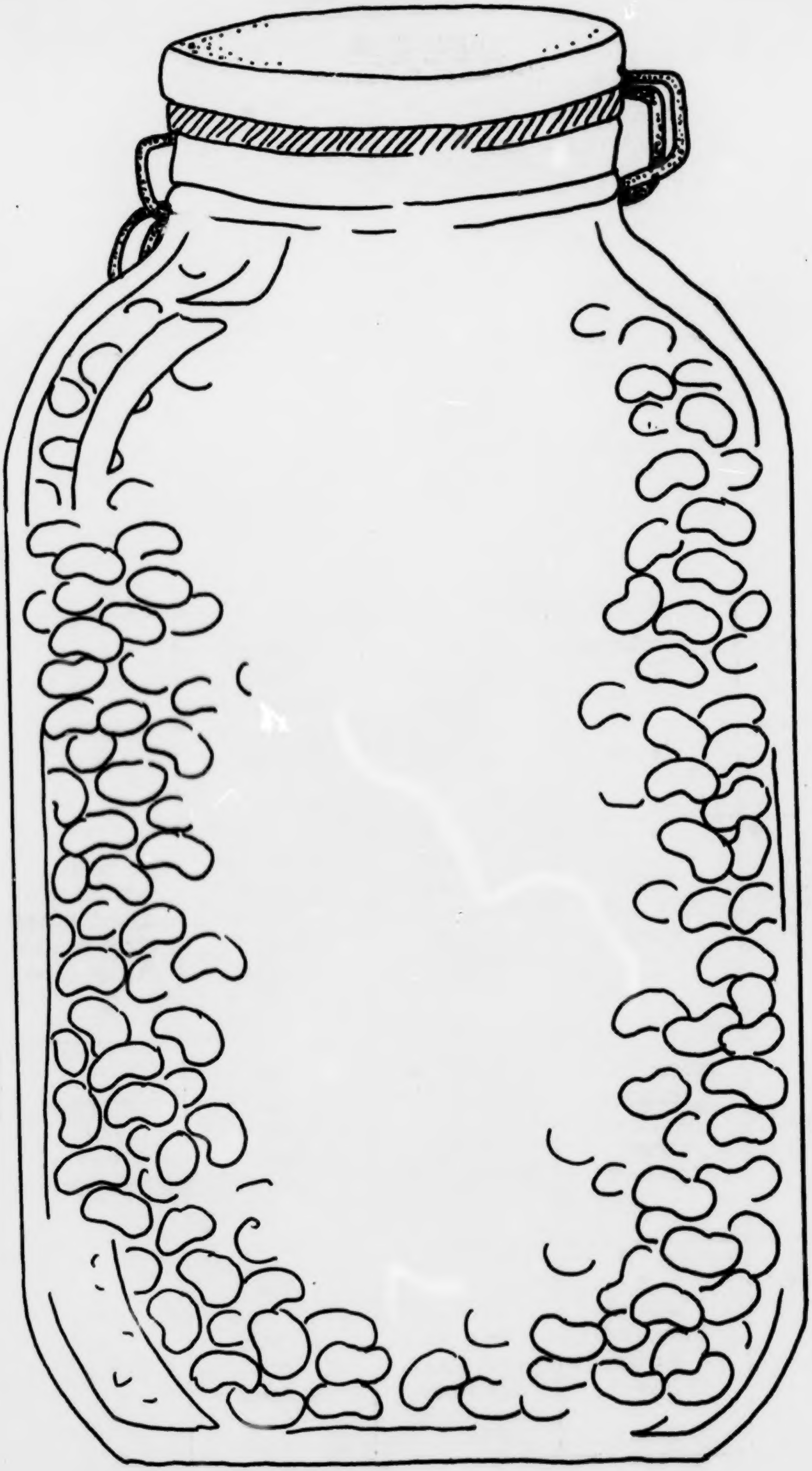


PINTO BEANS	GREAT NORTHERN BEANS	NORTH DAKOTA MINNESOTA	A MENU MAINSTAY	CUT FOOD COST
IRON CALCIUM AND POTASSIUM	TEMPERATE CLIMATE	BULK AND FIBER	ENERGY	DRY BEANS
KIDNEY	EXPAND	DRY EDIBLE BEANS	LEGUME	APHIDS LEAFHOPPERS
B-COMPLEX VITAMINS	MEXICO	N.D. RED RIVER VALLEY	COTYLEDONS	LEGUIMOSAE

EDIBLE BEANS
(Definition Cards)

beans exported to Central and South America	excellent N.D. bean used for baked beans	two states which produce beans	beans have been used by cooks for years	good food at a moderate cost
essential minerals provided by beans	N.D. has this climate	beans supply this for good digestion	beans are known as an energy source	beans which are eaten after they become fully ripe
N.D. bean used in chili	beans will enlarge 2½ times when cooked	N.D. is ranked 5th in U.S. production	a plant which bears pods	enemies of bean growers
Thiamine Pyridoxine Niacin Folic acid	a larger buyer of pinto beans	source of rich deep soil and good moisture	the first leaf growing from a seed	the pea family

BEAN TASK CARD



EDIBLE BEANS

1. Dry beans, since the earliest of time, have filled an important role in human living besides keeping humans lively. Today, dry beans provide the American cooks with hearty good eating at a low cost.

2. There are 12 different beans grown in the western USA. Compile a booklet that contains information on the name, size, color, and uses of these beans.
The names are:

- Baby Lima
- Light Red Kidney
- Blackeye
- Navy
- Dark Red Kidney
- Pink
- Garbanzo
- Pinto
- Great Northern
- Small Red
- Large Lima
- Small White

3. Do you know which of these beans are grown in our state?

(Kidney, Pinto, Great Northern, Navy)

4. As dry beans are cooked in most recipes, be sure the pot is large enough as to allow the beans to expand 2½ times!!

5. Beans help to balance your diet. What is a balanced diet? What should a balanced diet consist of?

(A balanced diet should consist of 30% calories from fat, 60% from carbohydrates, and 10% from protein.)

6. Protein is an important nutrient in ensuring health in humans. Dry beans contain the highest protein content of all commercial seeds. The protein contained in beans we eat helps your body in many ways. What are some of these ways?

(Build and repair body tissue, muscles, glands, bones, teeth, and skin)

7. Dry beans are also a rich natural source of the B-complex vitamins. What vitamins are these?

(Thiamine, Pyridoxine, Niacin and Folic acid)

8. Beans can be called the energy food. What is meant by this statement?

(They contain carbohydrates which, in beans, digest slowly and satisfy hunger longer.)

9. Beans contain what essential minerals?

(Iron, Calcium, and Potassium)

10. Beans supply bulk and natural fiber. Of what importance is this in maintaining a healthy body?

(Bulk and natural fiber help maintain regularity and a healthy digestive system.)

11. What makes North Dakota soil perfect for growing beans?

(Beans require rich deep soil, good moisture supplies and a temperate climate during the growing and harvesting seasons. This describes eastern North Dakota.)

12. What is meant by the term "temperate climate"?

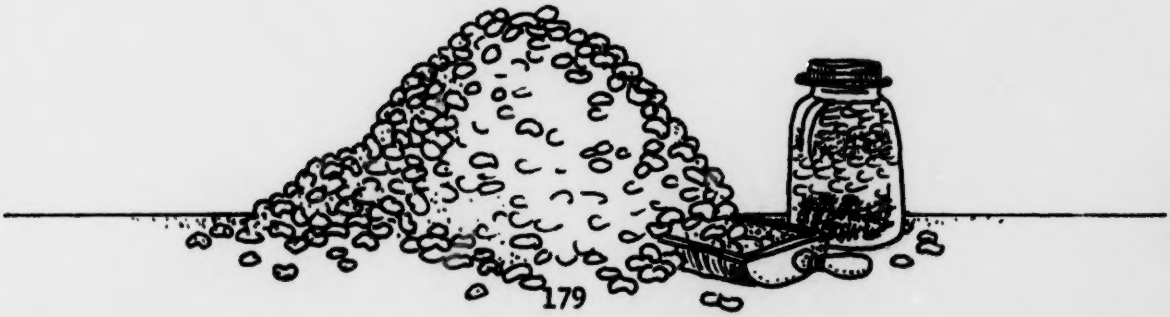
(Moderate in respect to temperature; not subject to prolonged extremes of hot or cold weather.)

13. Would you believe that an average of 14 million metric tons of edible dry beans are produced world wide each year!
That's a potful of beans!

14. Which bean grown in our state is exported to markets in Central and South America? They are popular in chili, refried beans, refried bean paste, and in most Mexican foods.

(Pinto)

15. What does the statement, "a hill of beans," mean?



GROW BEANS GROW!
(Flowchart Activity)

SUPPLIES:

Grow Beans Grow Illustration Page
construction paper
glue

INTRODUCTION:

Planting a bean or a whole crop requires certain steps. A flowchart can show the steps necessary to complete a task or to find a solution to a problem. Each step in the process for solving a problem is listed and in a particular order. Flowcharts can be thought of as blueprints or maps that can be followed to reach a desired result.

PROCEDURE:

1. Provide each student with a copy of the worksheet entitled "Grow Beans Grow," illustrated page.

2. Ask the students to cut apart the nine illustrated sections.

3. Allow time for students to study the sections. Place them in correct order so that the sequence will show how to grow a bean from beginning to end.

4. Check the students work before the illustrations are glued in placed on construction paper.

5. You may wish to make an overhead transparency of the correct sequence for checking purposes.

Grow Beans Grow Sequence Order

1. Place two (2) wet paper towels on the bottom of a shallow dish. (A pie plate is good.)

2. Put ten (10) navy beans on the towels and cover with two (2) more wet paper towels.

3. Place the dish in a warm place; near the furnace, heat register, or in a sunny spot.

4. Sprinkle the towels with water everyday. Keep towels moist. DO NOT LET THE BEANS STAND IN A LOT OF WATER, AS THIS WILL CAUSE THEM TO ROT.

5. In several days, some of the beans will germinate (will grow a root).

6. When the root is about one-half (½) inch long, you may plant the germinated seed in a small pot with dark rich dirt. Put the seed about one (1) inch under the surface of the dirt.

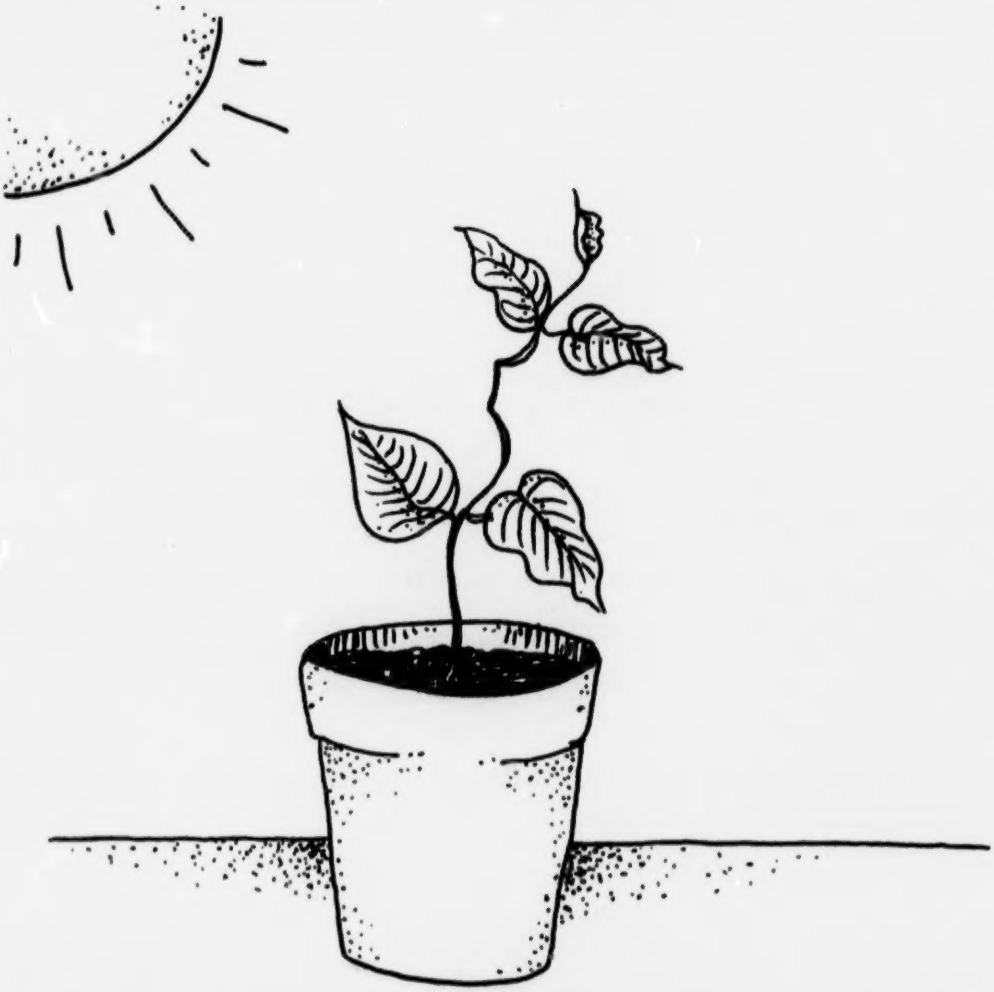
7. Water the pot when the soil dries out.

8. Soon the seed will sprout and then as it grows larger it will grow leaves.

9. Plant it outdoors if it is spring and harvest some beans in the summer and fall.

ANOTHER IDEA:

Use the completed project as a set of directions for your class to actually germinate a seed. Grow the seeds either as a class project at school or have students grow them at home.
Encourage the children to keep notes on the plant's growth,



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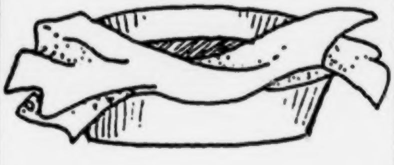

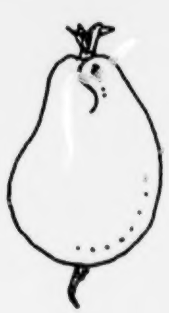

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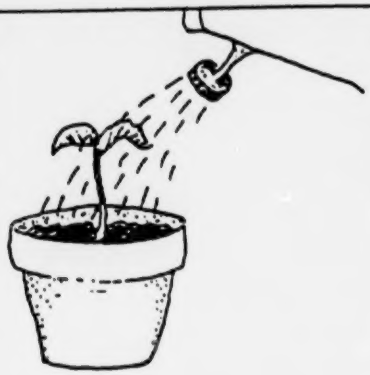

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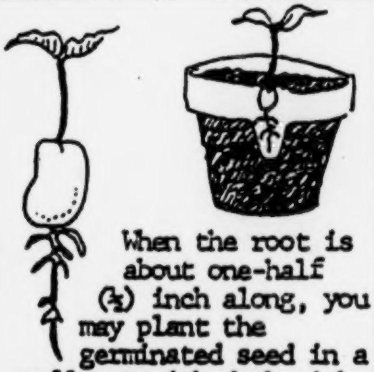

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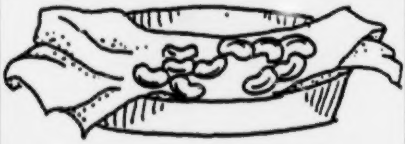

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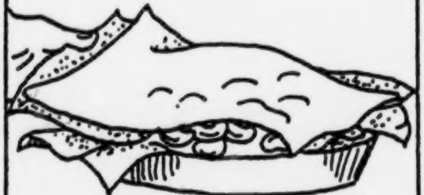

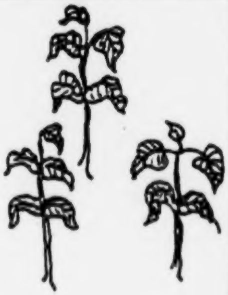

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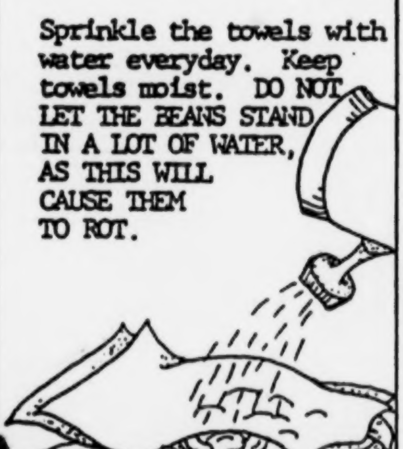

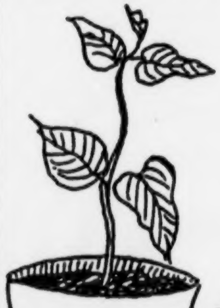

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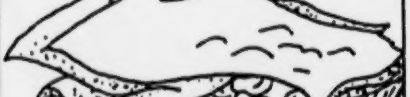

LOAMY, WELL-AERATED	SEPTEMBER OR OCTOBER	RED RIVER VALLEY	GRAND FORKS	PARK RIVER
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POTATOES
(Definition Cards)

Best Type of soil for potatoes	Harvest time	Famous for their North Dakota potatoes	Location of french fry plant	Location of potato flour plant
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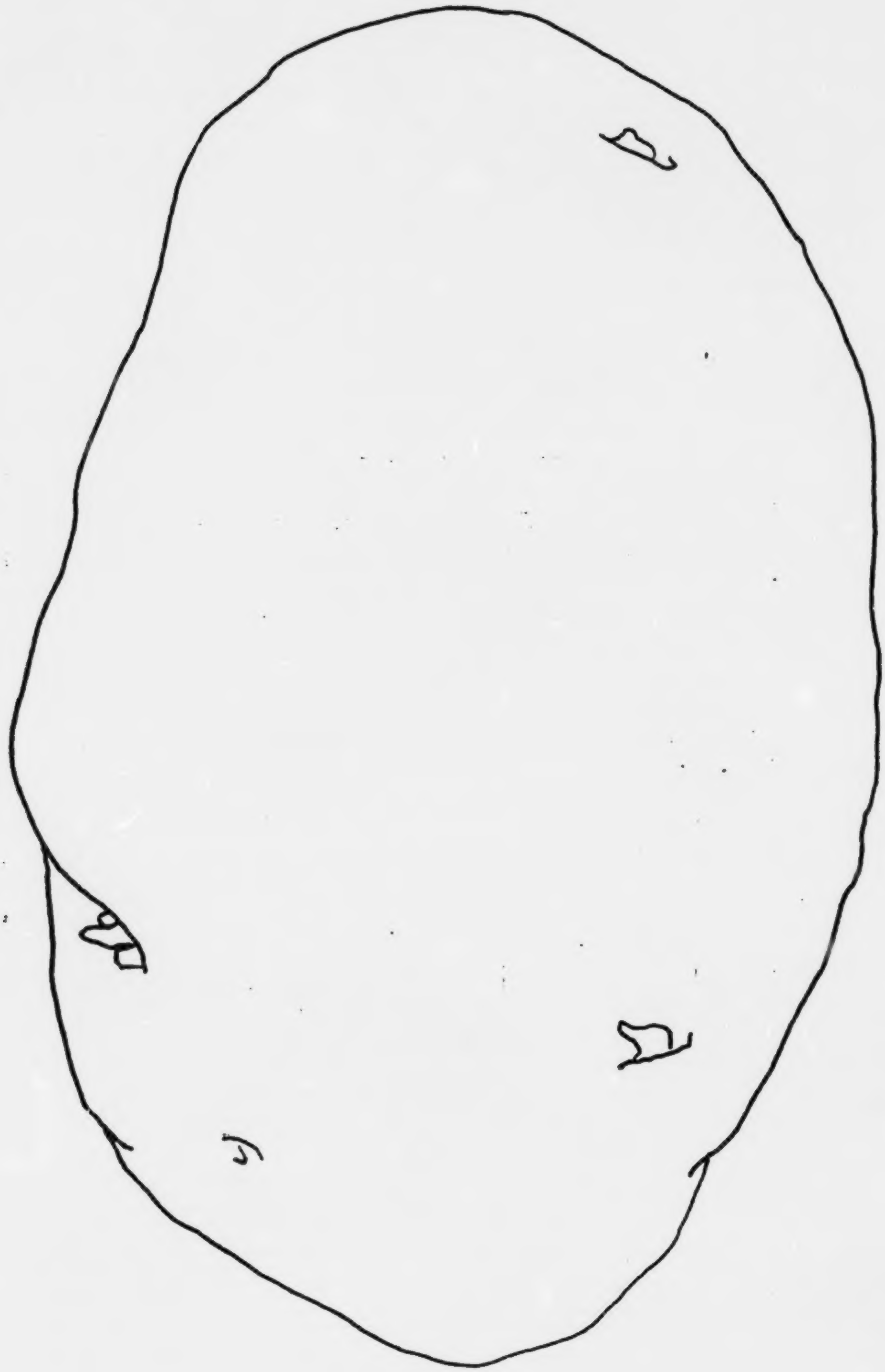
POTATO TASK CARD



THE POTATO PATCH

1. Alexander Henry is credited with planting the first potato in the Red River Valley. Henry brought the first seeds for this planting down the Red River from Canada. Henry has an interesting history in connection with our state. Research this Northwest Trader's life.

2. A conflicting claim states that the Mandans, Arikara and Hidatsa Indians located in the Missouri Valley were the first to raise potatoes, corn and squash. But the credit for growing the first potatoes and other vegetables in our state is given to whom?

   (Alexander Henry, the first white man to farm in North Dakota.)

3. Potatoes were the main vegetable in military gardens in our state. Post soldiers were required to raise their own vegetables as part of their duty and each company had its own garden. What other vegetables might have been raised in these military gardens?

   (Squash, beans, beets, carrots, corn, etc.)

4. Early settlers to North Dakota planted potatoes and some corn the first year. The resulting good crop reduced the prospects of winter famine. During the long winter the family ate baked potatoes on the hearth. Read about the Selkirk settlers who located at Pembina in 1814. How would a good potato crop the summer before have changed history?

5. North Dakota has become one of the most important areas specializing in potato production. As long as potato production remains in the hands of highly efficient producers, we will continue to rank as one of the leading potato producing states in the United States. Our specialization can be seen easily by the various types of processing plants our state has. Do you know what some of these are?

   (Potato Flour Plant, French Fry Plant)

THE POTATO PATCH CONTINUED

6. The founding of the potato industry in our state can be attributed to Nels Folson. Mr. Folson started commercial planting near Hoople in 1905. What other potato-connected accomplishments was he known for?

   (Establishing the northern Red River valley seed trade; establishing our state as a seed production state)

7. Did you realize many North Dakotans eat potatoes twice a day? Taters, spuds, or just plain potatoes--whatever you might call them--are an important item on our menus. Have several of your classmates and friends keep track of the number of times they are served potatoes in one week.

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    Read this delightful book and then write a history of the potato through its own "eyes".

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    Do you know how the first potato chips came to be? About 100 years ago in a fancy hotel in Saratoga Springs, New York, a plate of fried potatoes was sent back to the kitchen with a complaint that they were too thick. The insulted chef sliced potatoes paper thin, fried them, and served a plate to the guest (it was Cornelius Vanderbilt), expecting to hear that they were now too thin. But, to the chef's surprise, the guest loved them, as everyone else did who tasted the new discovery.

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POTATO PRINTS
(Art Project)

SUPPLIES:

potatoes
spoons or small knives
tempera or acrylic paint
paper
old sponges

INTRODUCTION: Our state is an important potato raising state. Carloads of North Dakota grown potatoes are shipped to Eastern and Southern states to be used as food. There are select areas of North Dakota where potatoes are grown. The Red River Valley produces the majority of potatoes grown in the state. There are a few potatoes grown in western North Dakota and a few in the south-central part of the state.

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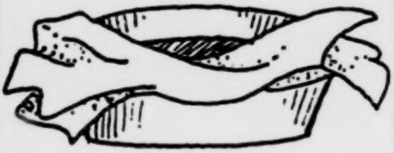

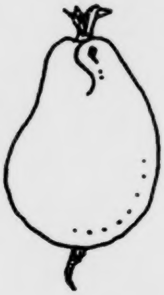

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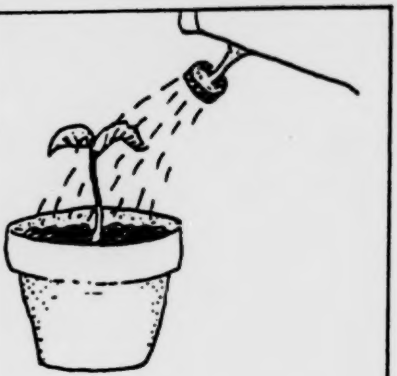

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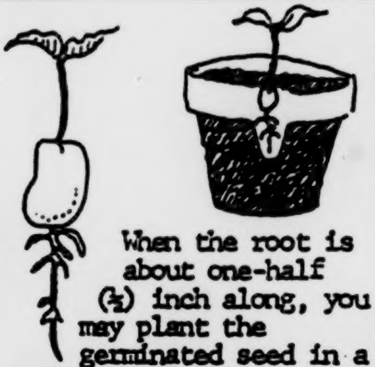

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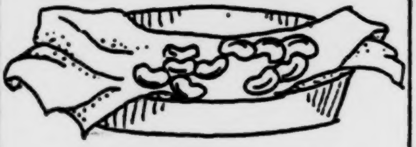

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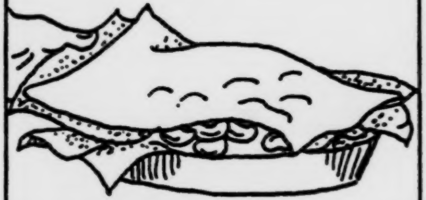

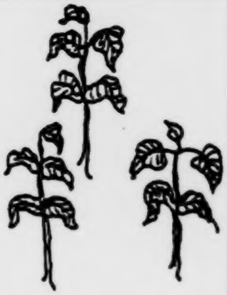

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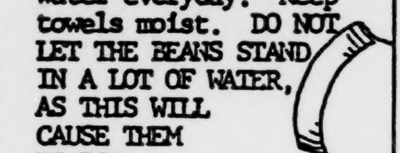

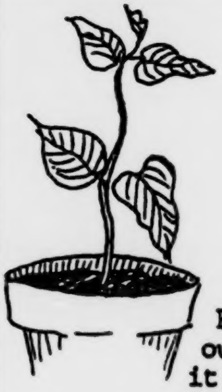

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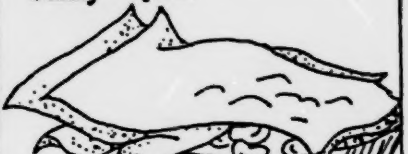

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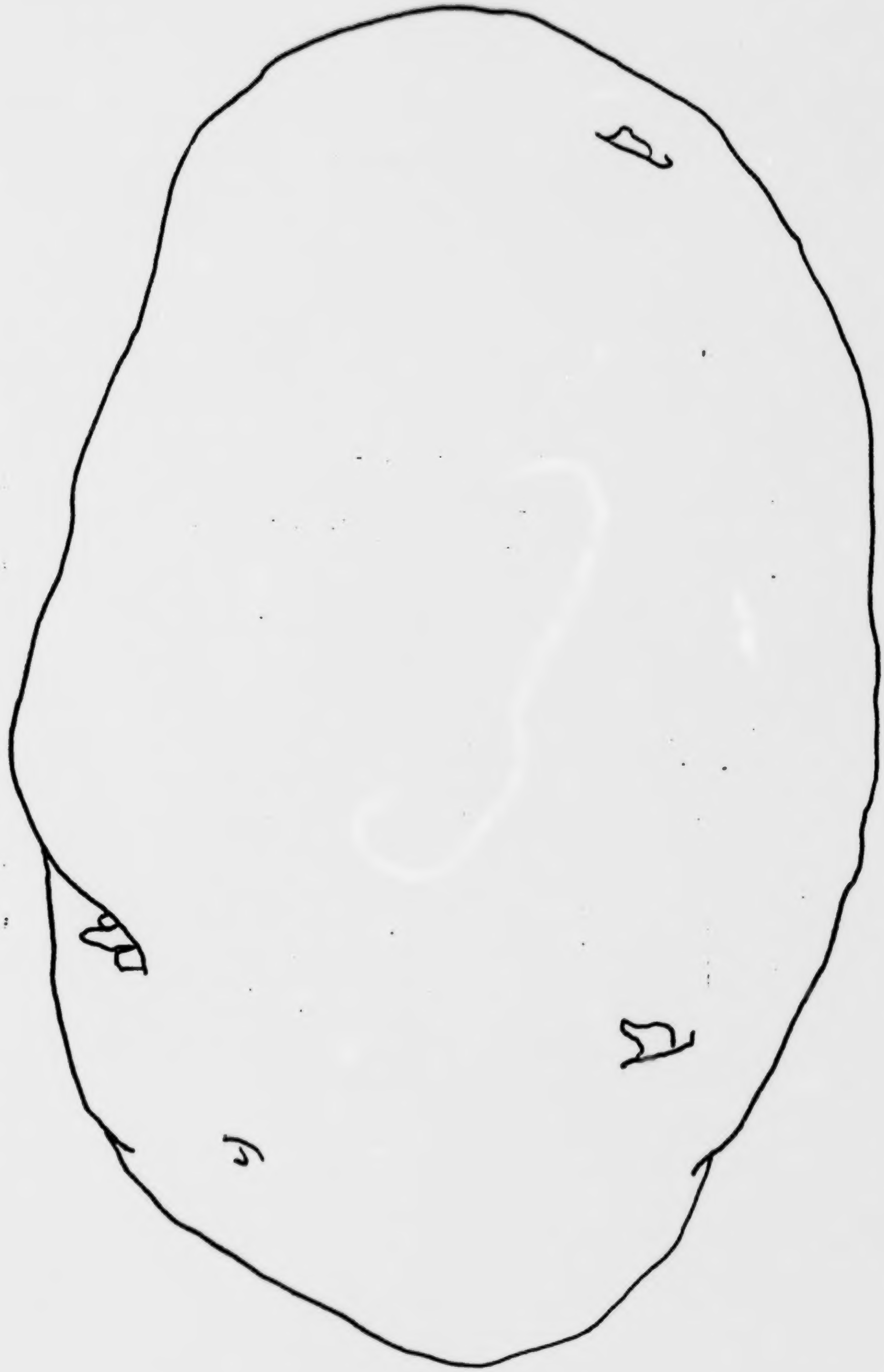

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BEST COPY AVAILABLE

POTATO PRINTS
(Art Project)

SUPPLIES:

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spoons or small knives
tempera or acrylic paint
paper
old sponges

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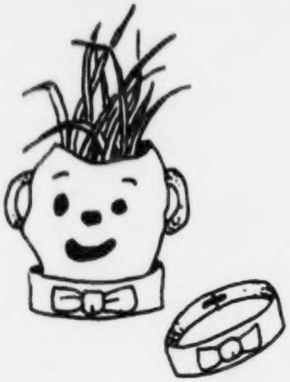
POTATO PRINTS CONTINUED
ANOTHER IDEA:

"POTATO HEADS"

SUPPLIES:

potatoes
cotton balls
cloves
carrots
grass seed

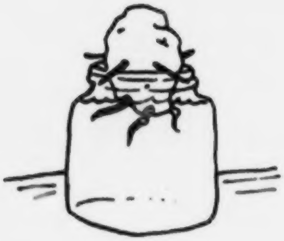


PROCEDURE:

[illegible] the top of the potato, scoop out some of the pulp. Stuff the cavity with a cotton ball. Create eyes, nose, mouth and ears with cloves, carrot slices or other materials.

Create a shirt for your potato head by making a ring of construction paper or by using a section of toilet paper roll. Decorate with a collar or kerchief.

Moisten the cotton ball and add the grass seed. Water daily and soon your potato head will need a haircut!



ANOTHER IDEA: "PLANT A POTATO"

SUPPLIES: potato
jar
toothpicks
knife
flower pot
soil

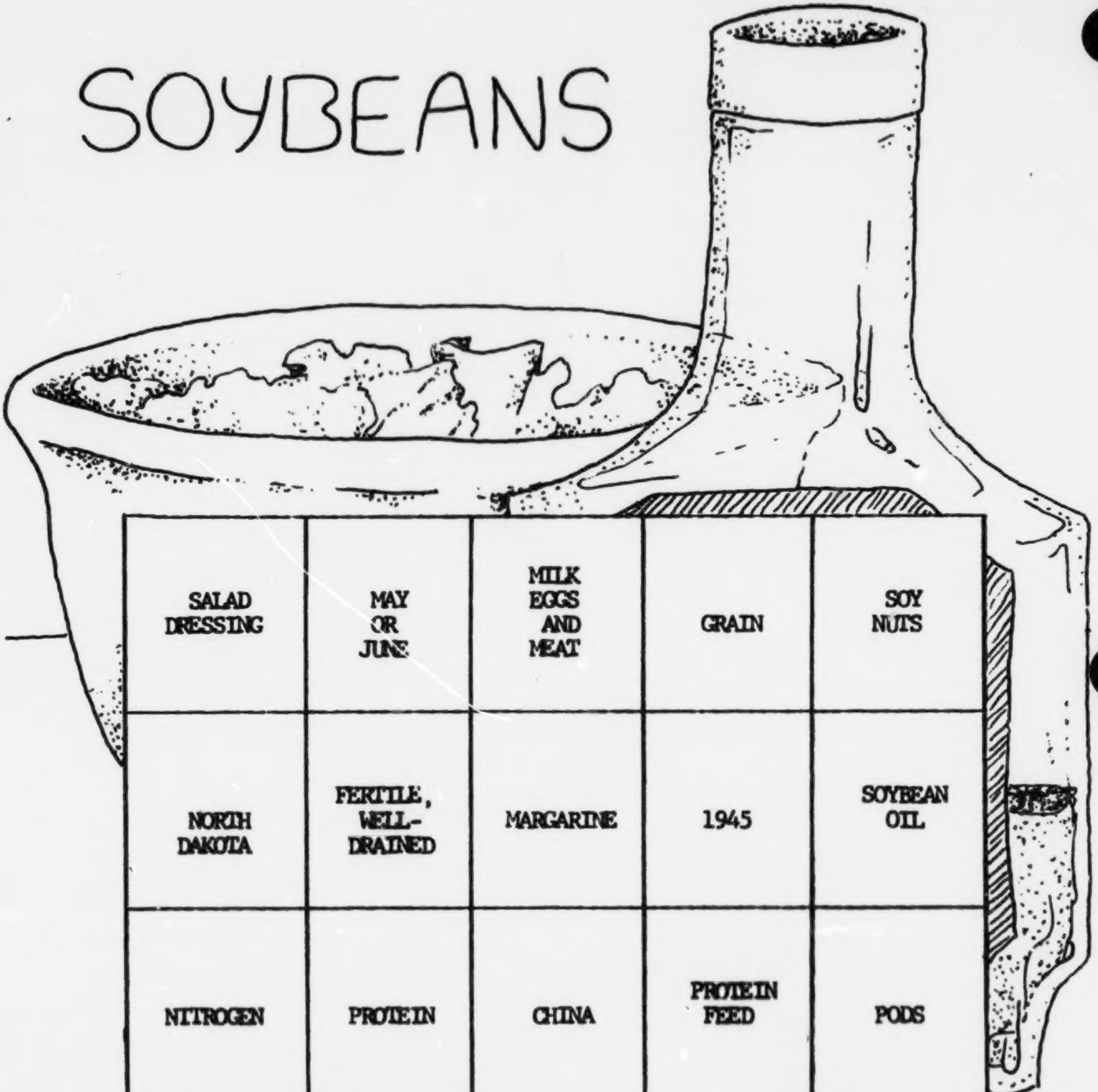
PROCEDURE: 1. Push the toothpicks into the center of the potato, one on each side.

2. Fill the jar with water; then place the potato halfway into the water. The toothpicks will support it.

3. Set aside for about a week keeping the jar filled with water.

4. When shoots have appeared and are about three inches long, cut the potato into pieces, each piece with one shoot. Place each piece in a pot and cover with soil. Water, and soon you will have a potato plant. If possible, plant outdoors.

SOYBEANS

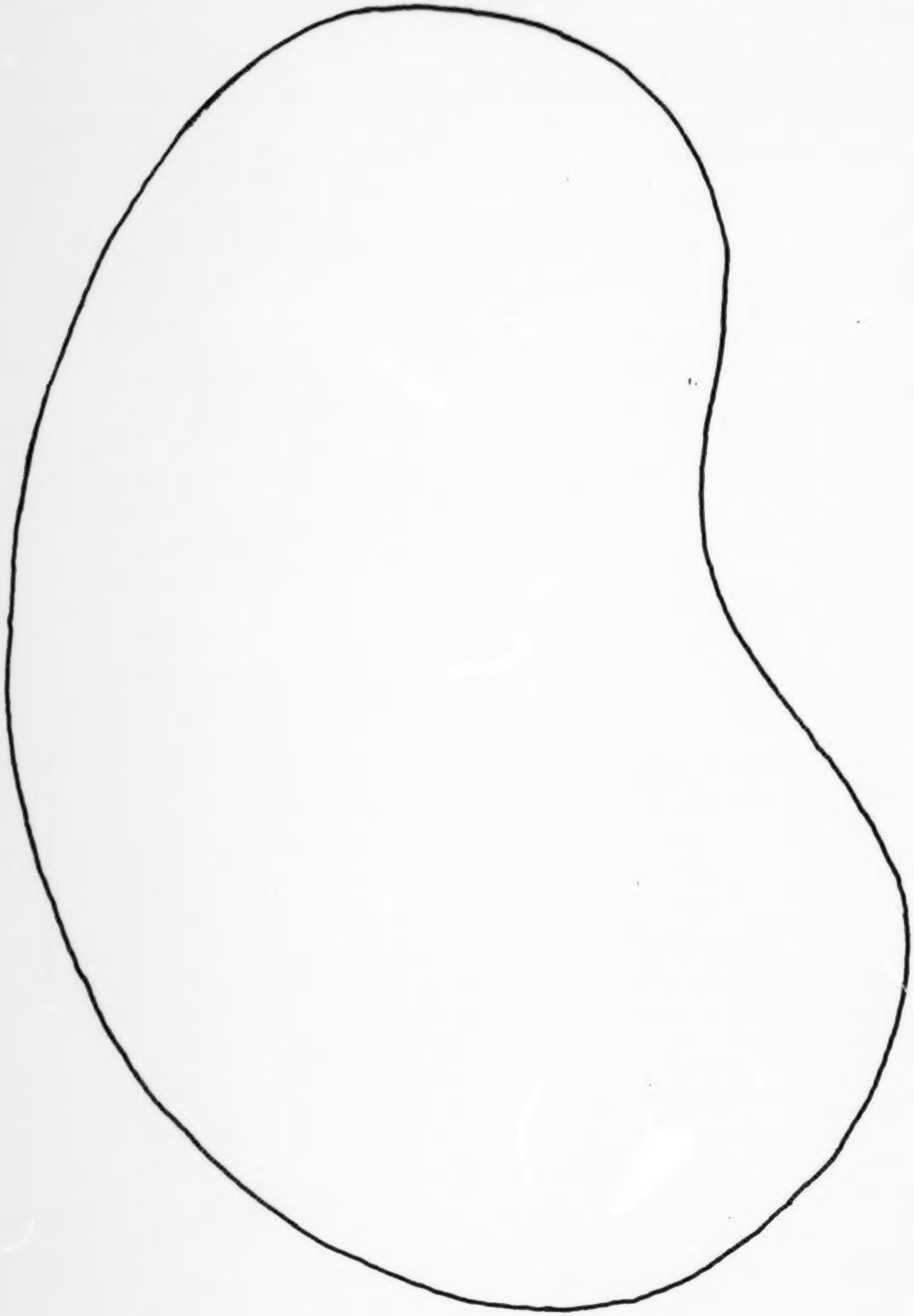


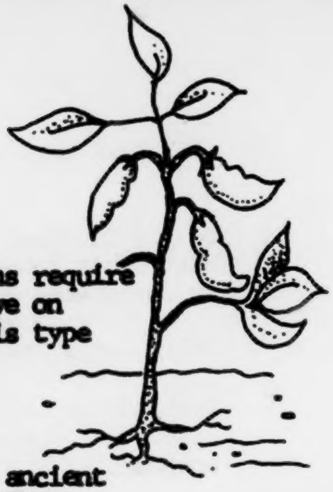
SALAD DRESSING	MAY OR JUNE	MILK EGGS AND MEAT	GRAIN	SOY NUTS
NORTH DAKOTA	FERTILE, WELL-DRAINED	MARGARINE	1945	SOYBEAN OIL
NITROGEN	PROTEIN	CHINA	PROTEIN FEED	PODS
LEGUME	VEGETABLE OIL	MEAT SUBSTITUTE	PLASTIC	U.S.A.

SOYBEANS
(Definition Cards)

A food product	Planting time of soybeans	Other sources of protein	Soybeans	A food product
Location of most soybean production	Type of soil needed to grow soybeans	A food product	The year North Dakota started raising soybeans	Used in mayonnaise
Important plant nutrient	Soybeans most valuable nutrient	Place where soybeans originated	Eaten by hogs, poultry and cattle	Contain seeds called beans
Soybeans are members of this plant family	A main food product	Soybeans	A product	Produces 60% of world's supply

SOYBEAN TASK CARD





SOYBEANS: PROTEIN PROVIDER

1. North Dakota has been raising soybeans since 1945. Soybeans require the same type soil and conditions as corn does. They thrive on fertile, well-drained soil What part of our state has this type of soil and thus raises most of North Dakota's soybeans?

   (Southeastern)

2. The soybean originated in China over 3,000 years ago. The ancient Chinese considered the soybean their most important crop. They considered it as one of the five sacred grains necessary for what? What are the other 4 sacred grains? What would you consider the 5 most sacred grains to be?

3. Soybeans are a "savior" in easing the world's food shortage. They can be grown on only an acre of land and provide 10 times as much protein as can beef cattle on the same amount of land.

More people need to realize the value soybeans have in providing the world with protein! Create a talk show and interview a soybean.
Draw a poster to boost the sale of soybeans.

5. Why are soybeans called "beans" when they are really a grain?

   (Some of the small flowers on the soybean plant produce pods which contain 2 or 3 seeds called beans)

6. The United States produces 60 percent of the world's soybeans. What are the leading soybean states? Where does North Dakota rank in comparison to them? Create a graph showing soybean production.

7. Soybeans are a truly remarkable crop! They are a great source of vegetable oil and protein meal for livestock. What North Dakota livestock eat high-protein feed made from soybeans?

   (Cattle, hogs, poultry)

8. People in other countries eat soybeans for their source of protein. What other foods can provide you with protein? HINT--all are raised in our state!

   (Milk, eggs, meat)

9. Soybeans are an array of various colors during their growing period! Research these colors and stages, then create a color book about the soybean.

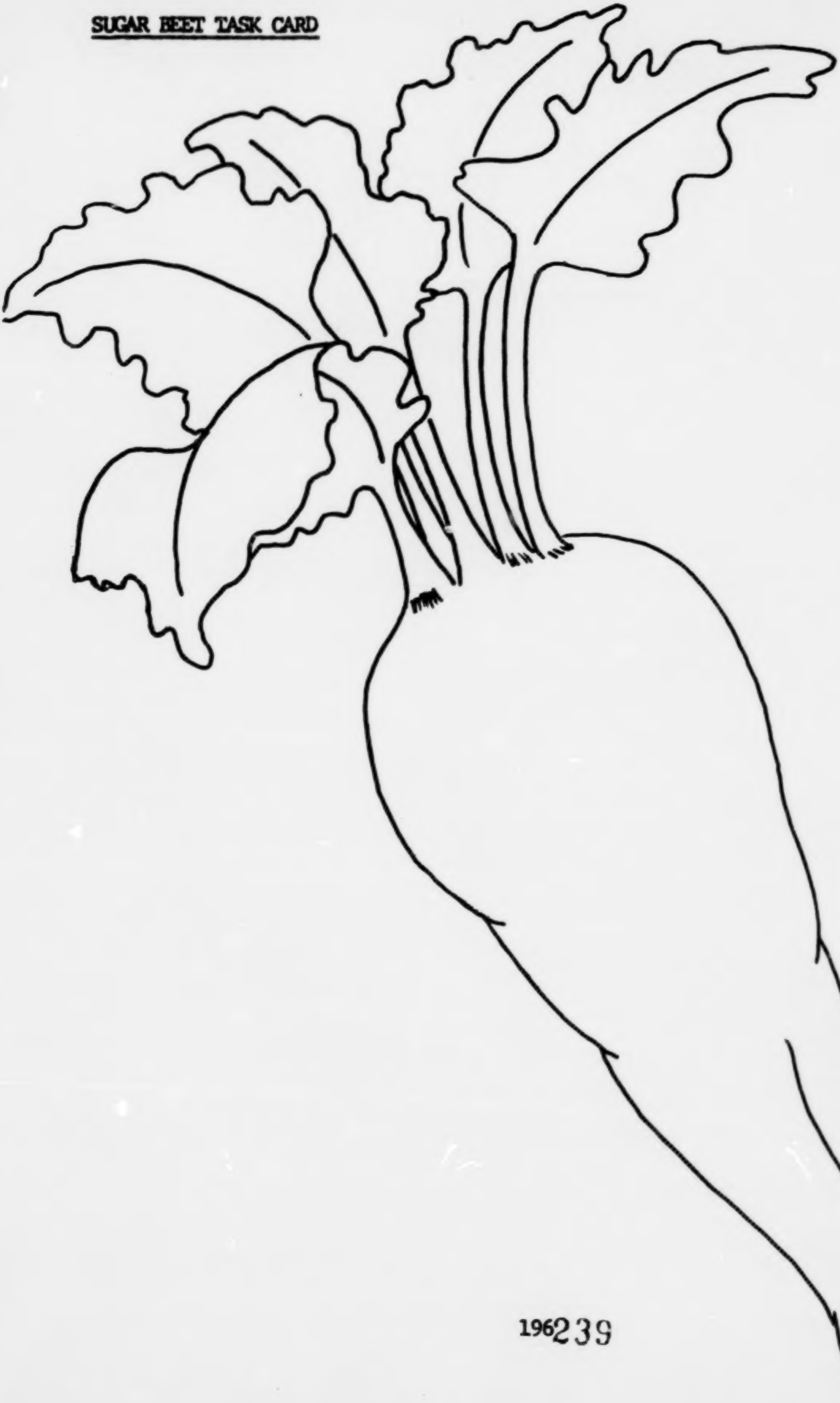
10. Would you believe soybeans are used in such products as paint, varnish, candles, soap and even plastics?! They even add nutrients to baby food, cereals, and candy!

11. The soybean is a member of the legume family. Legumes, with the help of a specific bacteria are able to take what out of the air, affix it to the roots in small nodules and make it available for use by the plant? Name this important plant nutrient.

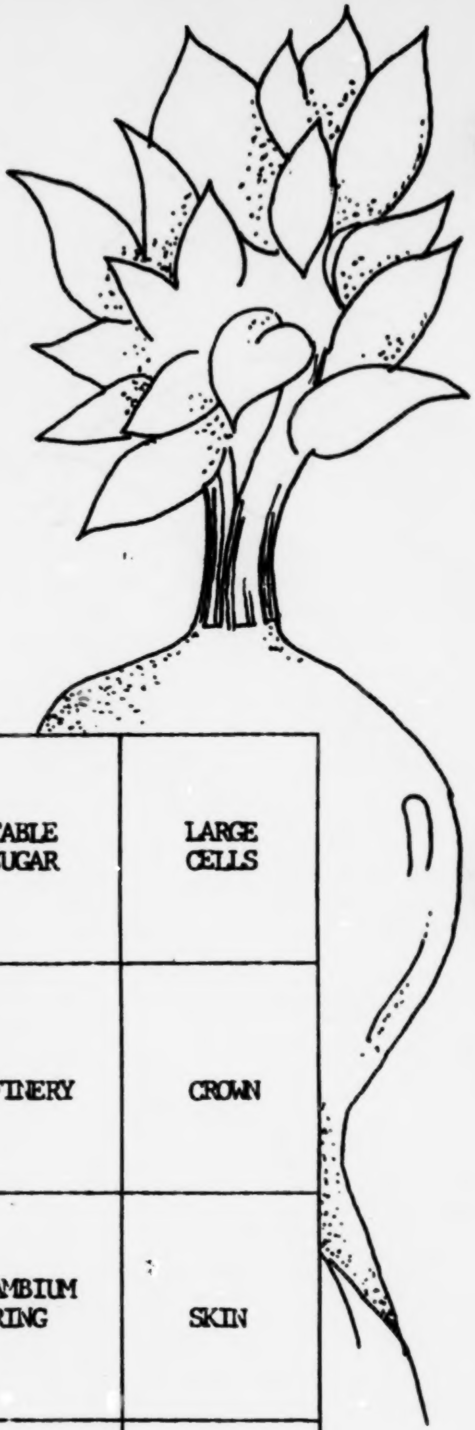
    (Nitrogen)

12. Next time you spread mayonnaise or salad dressing on your turkey sandwich, you may be eating a North Dakota-grown by-product. How? Ninety percent of soybean oil is used in food products. Mayonnaise and salad dressing are two of these. Others are vegetable shortening and margarine.

SUGAR BEET TASK CARD



SUGAR BEETS



PULP	MOLASSES	SILVERY-WHITE	TABLE SUGAR	LARGE CELLS
DRAYTON, N.D.	RED RIVER VALLEY	MEXICAN-AMERICANS	REFINERY	CROWN
RESIDUE FROM SUGAR-REFINING PROCESS	4TH IN NATION	ANNUAL PLANT	CAMBIUM RING	SKIN
SUGAR	STATE HAVING SIX FROST-FREE MONTHS	SMALL CELLS	BLACK ROOT, LEAF SPOT, ROOT ROT	AFTER ONE YEAR

SUGAR BEETS
(Definition Cards)

Used for livestock feed	Syrup juice left after boiling	Color of sugar beet pulp	Sugar beets are second only to sugar cane in production	Contain water
Location of first sugar beet factory in N.D.	Area of N.D. which grows sugar beets	Manual laborers who work in fields	Place where sugar is made	The top of the sugar beet
Molasses	Production ranking in 1982	Takes one year to grow	Location of cells seen in cross section	Light tan in color
13-22% contained in beet	Area where sugar beets are most profitably grown	Contain sugar	Diseases that attack sugar beets	Dug up and sent to refinery

SUGAR BEETS

1. Sugar beets grown in the Red River Valley of our state are not like the red beets you eat for dinner. What color is the skin and pulp?

   (The skin is light tan and the pulp is silvery white)

2. Eastern North Dakota has the climate and rainfall best suited for raising sugar beets. Sugar beets need an average summer temperature of 67-72 degrees Fahrenheit with cool nights and warm days. What is North Dakota's average summer temperature?

3. The first sugar beet factory was built where in our state? Where are other factories now located?

   (Drayton--the American Crystal Sugar Factory;
   East Grand Forks, Moorhead, Crookston, Minnesota--east of the Red River)

4. Table sugar is made from North Dakota sugar beets. What percent of the sugar beet contains sugar?

   (13-22%)

5. Obtain a North Dakota sugar beet. Cut it crosswise. Notice the large cells arranged in rings called cambium rings. The large cells store water. What do you think the small cells contain?

   (sugar)

6. Sugar beets are biennial plants. This means it takes two years for the plant to mature. But sugar beets are usually dug up after the first year and sent to the sugar refinery to be made into sugar. Can you make a book showing the "Sweet Story of the Sugar Beets to Sugar?" You might use some of these terms:

   annual
   crown
   cambium ring
   molasses
   washing
   cutting
   slices
   pulp
   purified
   filtered
   boiled
   stem
   dried
   marketed
   packaged
   cells

7. Molasses is the syrup juice of the beet. It is left after the sugar and most of the water has been removed. What is this molasses used for?

   (It can be mixed with grain to feed livestock such as cattle;
   it can also be used to make rum)

8. After boiling the sugar out of the sugar beet, pulp is left. What is this pulp used for?

   (Livestock feed)

9. Sugar beets are the only crop grown in our state which requires some form of manual labor. Formerly, the plants, after growing the height of a few inches, needed to be thinned by hand. The workers also used a hoe to loosen the soil around the beets so they would grow better. In the fall at harvest time, the beets were dug up. Next, the tops needed to be cut off with a special knife. Then they were loaded onto trucks and taken to a factory. How do machines harvest sugar beets now?

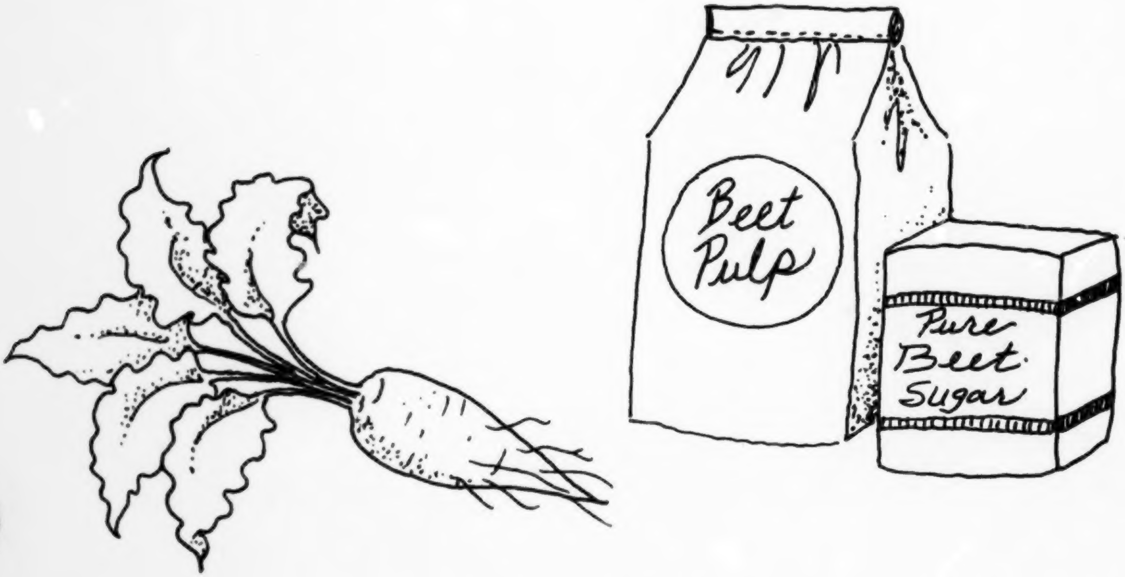
10. Where does our state get all the manual laborers who work in the sugar beet fields?

    (Some are from the Red River Valley but many are Mexican-American)

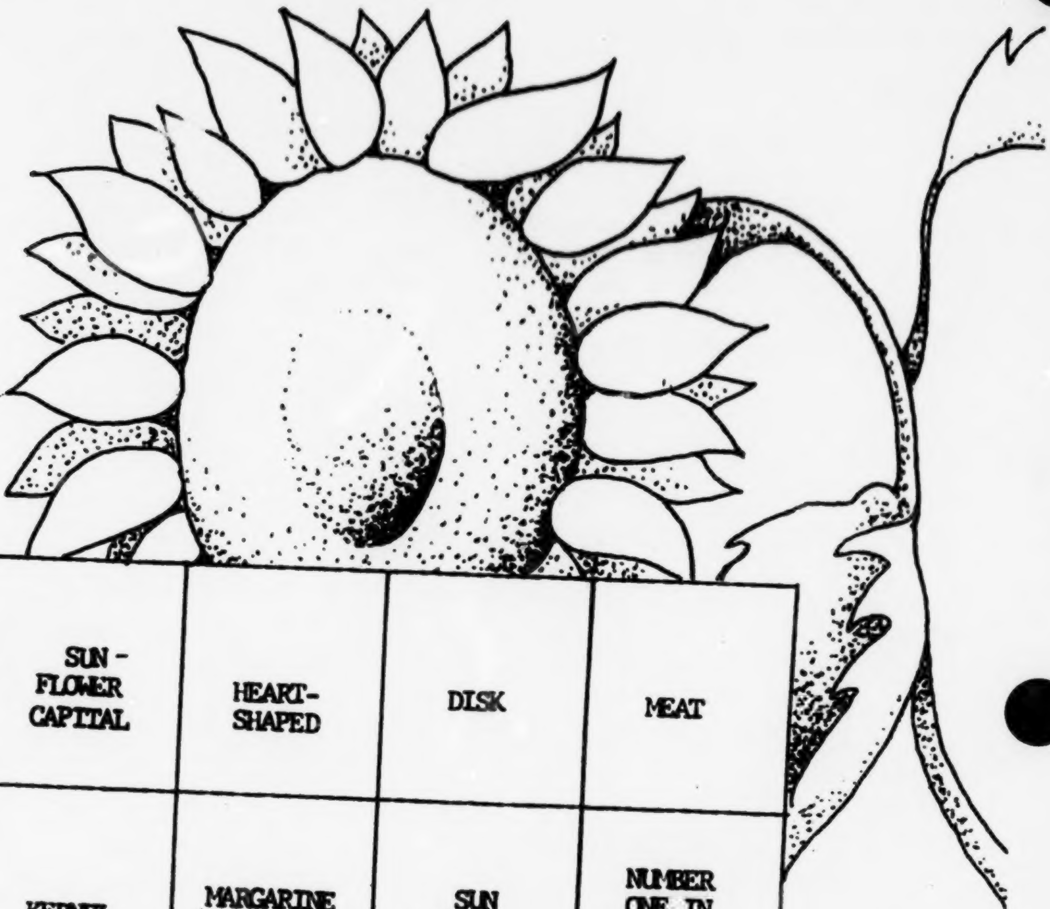
11. Write to the American Crystal Sugar factory at Drayton. Ask them for any information about the plant and its products.

12. What ranking did North Dakota sugar beet production have in 1982?

    (Number 4 in the nation)



SUNFLOWER

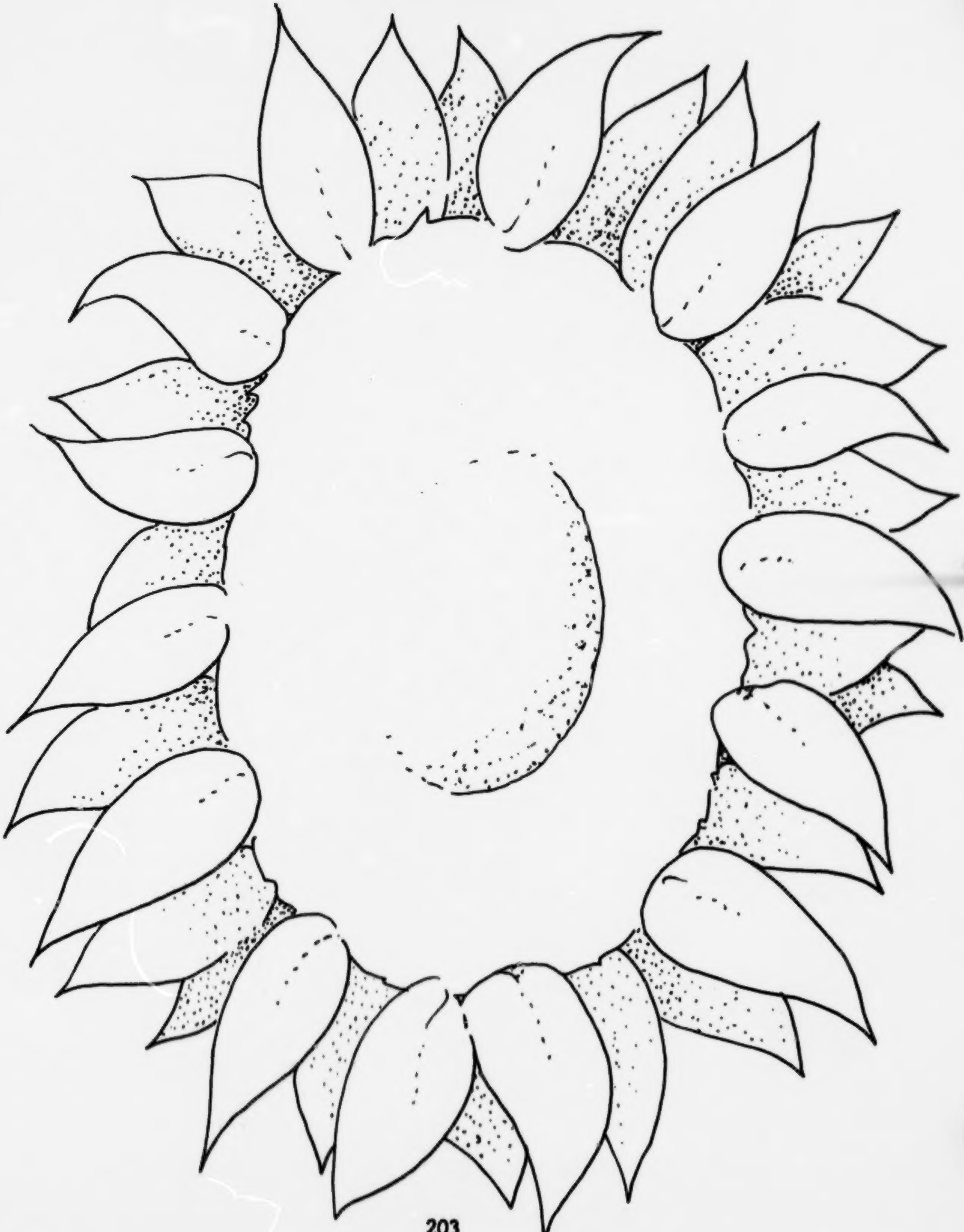


SUNFLOWER SEED-MEAL BALLS	SUNFLOWER CAPITAL	HEART-SHAPED	DISK	MEAT
CONFECTIONARY	KERNEL	MARGARINE AND SUN-BUTTER	SUN FLOWER SEEDS	NUMBER ONE IN UNITED STATES
SUNFLOWERS	COMMERCIAL BIRDSEED	SUN OIL	49TH PARALLEL	EAST
BEES	BLACKBIRDS	SYMMETRY	COMPLETE PROTEIN	MAMMOTH

SUNFLOWER
(Definition Cards)

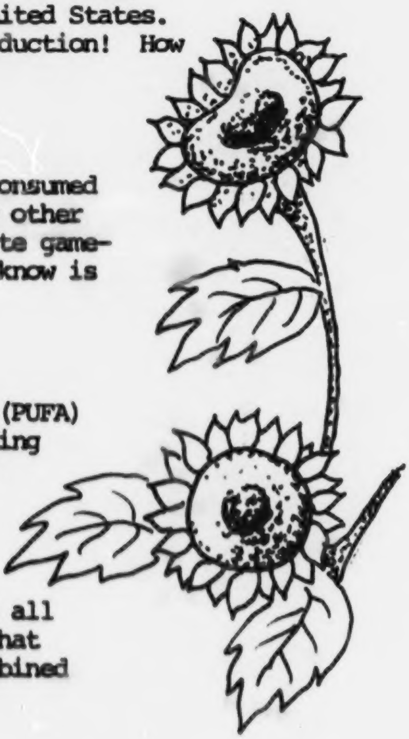
Hidatsa warriors ate these	North Dakota	Sunflower leaves	Place where seeds are located	The inside of a sunflower seed
Non-oil sunflower	Nut meat, hulled sunflower	Food products	Confectionary striped large seeded sunflower	1982 production nationwide
Contain fiber necessary for digestion	Made with sunflower seeds	Made from crushing sunflower seeds	Location of North Dakota	Direction blooming sunflower face
Insects that pollinate sunflower	A grower's enemy	The spiraling of seeds on the head	Sunflower contain every essential amino-acid	A variety of the sunflower

SUNFLOWER TASK CARD



SUNFLOWER

1. North Dakota could be referred to as the "Sun Country". In 1979, sunflower was raised in four major states across the United States. North Dakota that year could claim 70% of the total production! How did our state rank in 1982?



2. The Baltimore Orioles during the 1980 baseball season consumed nearly three thousand packets of sunflower seeds! Many other baseball players as well as many fans enjoy this favorite game-time snack. What many of these people probably do not know is that the sunflower kernel is an excellent food!!

3. Sunflower oil is higher in polyunsaturated fatty acids (PUFA) than all other oils except safflower. PUFA helps carrying cholesterol in the blood and expands the blood vessels. What diseases might benefit from high PUFA products?

   (high blood pressure or heart disease)

o vegetable proteins are complete. Sunflower contains all eight essential amino acids, but is short in lysine. What other vegetable protein should sunflower kernels be combined with to make the protein complete?

(soybeans, edible beans, spinach, or wheat germ)

5. Compare the major kinds of cooking oils. Show the percentage of linoleic acid, the only essential fatty acid, in each.

6. The Hidatsa Indian tribe of North Dakota did not know how nutritious sunflower kernels were, but they did use them. They made balls from sunflower seed meal to help sustain them on long journeys. One Hidatsa woman was quoted as saying, "It was surprising what effect nibbling at the sunflower seed ball had. If the warrior was weary, he began to feel fresh again; if sleepy, he grew wakeful."

7. The sunflower is native to North America. History tells us other Indian tribes beside the Hidatsa used the sunflower. The Iroqois used the sunflower seed oil to cook their food, make paint for their bodies, and to dress their hair. Research the Hopi Indians to find out how they used the sunflower.

(They made dye from the flower and used it to paint)

8. The Spanish explorers of the late 1500's carried the sunflower with them back to Europe. There it was admired as an ornament and as a curiousity. The Europeans thought what an amazing place this New World must be to be able to produce such a startling flower that grows so quickly. How big does a sunflower grow?

9. Two main kinds of sunflower seeds are grown; a large, striped seed for eating out of your hand, and a smaller black seed which is crushed into oil. Do you know which type is grown mostly in North Dakota?

(smaller seeds for oil)

10. Sunflower seed importers stipulate that their seeds must be grown north of the 39th parallel because of the higher polyunsaturated fatty acid content. On what parallel is North Dakota situated? Why is this a plus in exporting our seeds?

(49th parallel)

11. "If you eat like a bird" you will love sunflower seeds. North Dakota sunflower growers have several enemies but high on the list of worst enemies is birds. Birds eat the sun kernels, unfortunately it occurs while they are still in the field. Find out which type of bird in particular is most harmful to the sunflower.

(Blackbirds)

12. Commercial birdseed contains several ingredients. One of the main ingredients is grown in our state. Can you guess what it is? What are some other ingredients?

(Sunflower seeds)

13. The story of sunflowers and bees often go hand in hand. Bees are placed in sunflower fields to assure better pollination. List the benefits that both the bee and the sunflower receive by living next to each other.

14. Roast your own sunflower ! To prepare roasted sunflower kernels, place a single layer of raw, dehulled kernels in a shallow pan in a 300° F. oven for about 30 to 40 minutes. Vary the length of time according to the brownness and crispness that you like.

    Optional: After roasting, the kernels may be salted by stirring in about one teaspoon of melted butter or margarine to each cup of warm kernels. Stir until coated; remove any excess fat by draining on a paper towel. Salt to taste. Store tightly covered. Happy eating!

15. How many words can you make using the letters found in SUNFLOWER?

    (sun, low, owner, fun, run, no, now, snow, sow, flow, flows, row, etc.)

16. Sunflower are used for many other products besides seeds and oil. Research to find the names of these other products.

    (snacks, pet food, paints, bread, margarine, ice cream, and livestock feed)

17. What does the number series 1, 1, 2, 3, 5, 8, 13 . . . have in common with the sunflower? This sequence is directly related to the sunflower and many other plants and animals as well. An Italian mathematician named Fibonacci discovered the series in the 12th century. Read more about the sunflower and this fascinating natural formation in an article called the "Perfect Flower" by Palmer Hertsgaard, Horizons Magazine, Winter 1981-82, page 28. Can you unlock the secret to the number series and continue it on? 1, 1, 2, 3, 5, 8, 13, __, __, __, __, __, . . .

18. Did you realize that every sunflower is really more than one flower? It is really hundreds of flowers in a compact group. All of them are attached to the end of one stem. Only the outermost ring of flowers have petals. Each of them has a single large yellow petal!

19. The head of the sunflower is a wonderful show of symmetry. This is most evident at the seed stage. Each seed has an exact location and is flattened in such a way that the edge is toward the outside. This symmetry occurs other ways in nature. Can you name some ways?

(the pine cone, nautillus, pineapple)

20. Long ago on the Great Plains sunflowers had millions of prairie dogs and bison as animal neighbors. Both helped the sunflower to spring up across the prairie. Whenever a prairie dog threw earth while digging its burrow, sunflower seeds sprouted in the bare soil. The bison ate and trampled the prairie grasses thus making the place for these beautiful flowers to grow.

21. These giants of the Great Plains do have enemies. Squirrels use their sharp front teeth to cut off the whole head. Then they finish the meal seated on the ground. Chipmunks and mice find the many seeds that have been dropped and eat too. What are some other enemies?

(caterpillars, cutworms, sunflower midge, sunflower moth, sunflower beetle, weevils, blackbirds)

22. Sunflower was once considered a high risk crop because of the losses from diseases, insects, birds and weeds. What has changed that view?

(The use of integrated pest management practices)

SANDPAPER SUNFLOWER
(Art activity)

SUPPLIES: sandpaper (one half piece per child)
iron
crayons

INTRODUCTION: THE SUNFLOWER

-The face of the sunflower follows the sun throughout the day. (With new breeding they only face east).
-Sunflower plants grow as tall as 5 meters (over 15 feet).
-Why do sunflower heads droop? Because their hundreds of seeds become heavy as they mature.
-Do you know which state is considered the Sunflower Capital?
-Find more interesting facts about sunflower.

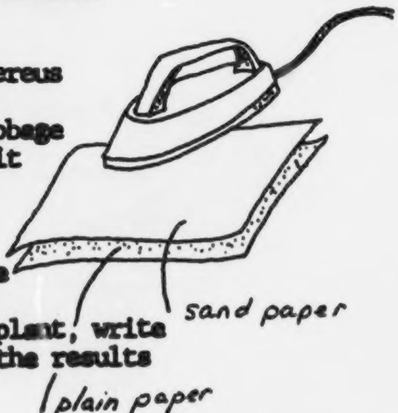
PROCEDURE:

1. Create a design on the piece of sandpaper.
2. Color heavily with crayons.
3. Place the sandpaper face down on the paper. Iron over the back of the sandpaper.
4. Pull apart. You will have a design on the sandpaper and a beautiful textured print.

ANOTHER IDEA: There are other flowers and plants that have unusual names and unusual features. Research some of these:

Four O'Clock
Flowering Tobacco
Giant Rafflesia
Bird-of-Paradise
Partridge Pea
Bladderworts
Venus-Flytrap
Sunden Plant

Night-Blooming Cereus
Prickly Pear
Western Skunk Cabbage
Jack-in-the-Pulpit
Compass Plant
Pitcher Plant
Mistletoe
Queen Anne's Lace



Have each child research an unusual plant, write a report, and make a print. Display the results in your own natural museum!

BEST COPY AVAILABLE

SPECIALTY CROPS;
NORTH DAKOTA'S FORGOTTEN CROPS
(Matchup exercise)

North Dakota farmers also raise specialty crops. These new crops are raised in smaller quantities but are a promising addition to our state's agricultural adventure!

Below are listed a few of these crops. Try to match the name of the specialty crop with its description or use.

____ 1. Safflower

____ 2. Mustard

____ 3. Canary seed

____ 4. Specialty crops

____ 5. Buckwheat

____ 6. Triticale

____ 7. Rapeseed

____ 8. Millet

____ 9. Alfafa

(Answers on page 263)

(L) Its kernels are used to make oil for margarine

(S) Oil

(Y) A cloverleaf-like plant with purple flowers grown for feed

(C) Grown in small amounts in N.D.

(I) Flour to make pancakes

(T) Scrap from grass grown for use as hay

(P) Three types--yellow, brown and oriental

(A) Combination of wheat and rye used for breakfast cereal

(E) Grass seed used as food for birds

GETTING TO THE ROOT OF IT
(Language arts activity)

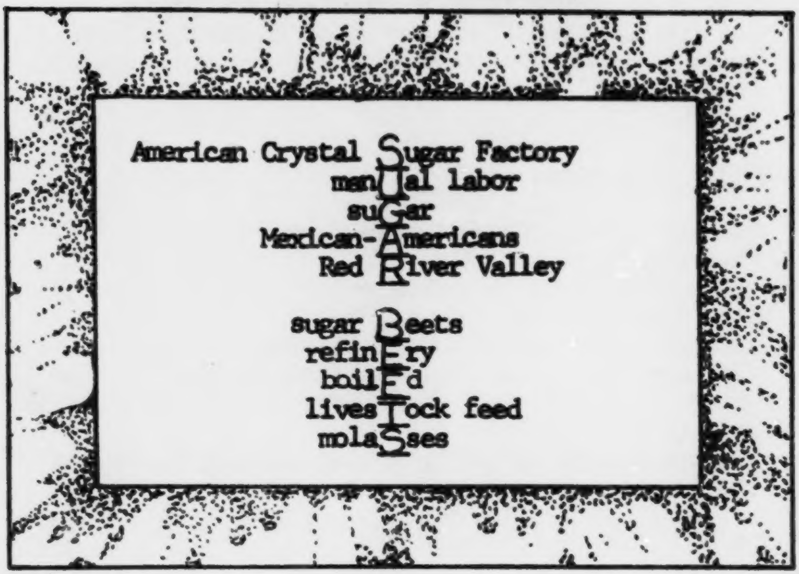
SUPPLIES: graph paper (optional)
references
Crop and Livestock activity cards

INTRODUCTION: Getting to the root of it is a common expression; it's the same as getting to the bottom of something. Let's get to the bottom of, or roots of, our agriculture!

PROCEDURE:

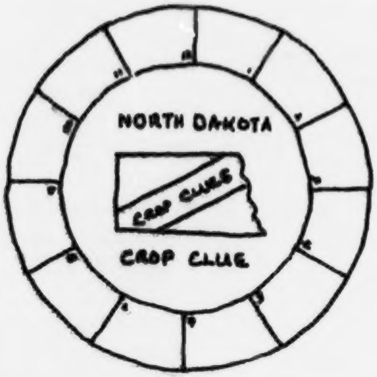
1. Brainstorm crops and livestock raised in North Dakota. Refer to the Crop and Livestock sections.
2. Have each student select a crop or animal to write about.
3. Encourage them to get to the "root" of things. Make a list of as many facts as possible that relate to their topic.
4. Allow time for students to collect information by reading about their topic in reference books and on the activity cards.
5. You may wish to play the North Dakota Crop game.
6. Display the facts by writing them into the name of the animal or crop as shown in the example below. Use graph paper to help the students line up the letters correctly.
7. The title of the animal or crop can be gone over with marker for emphasis.

ANOTHER IDEA: Display the project in a colorful way. Cut the graph paper down to fit the size of the title facts. Mount this on a background of art. For example, why not spatter or straw blow paint on a piece of white construction paper. Concentrate the majority of paint around the edges of the paper so it shows up colorfully.



CROP CLUE

(Crop recognition game)



SUPPLIES:

Crop Clue game board
Crop Clues
Crop Clue answer key
scissors
glue
construction paper or tagboard
clear contact paper (optional)

INTRODUCTION:

North Dakota is the number one agricultural state in the United States. Our soil and climate make excellent conditions for the production of a number of important crops. As North Dakotans, it is important that we know about these crops that are the backbone of our state's economy and way of life.

PROCEDURE: Game Construction

1. Cut out the four pie sections to the Crop Clue game board.
2. Arrange the pieces so that they make the complete circle game board.
3. Glue the four pieces together on a large piece of construction paper or tagboard. Color the board to make it attractive. (Optional--cover it with clear contact paper to make it more durable).
4. Mount the Crop Clue answer key on construction paper. (Optional--cover it with clear contact paper).
5. Cut out the Crop Clues and mount on construction paper. (Optional--cover with clear contact paper).
6. Mount Crop Clue directions on the back of the game board.

Crop Clue Directions:

1. Two-10 players (North Dakota farmers)
   One crop inspector (judge)
2. Place Crop Clues face down on the game board in the state (space) provided.
3. Taking turns, each player will draw from the pile the top Crop Clue card, read the fact out loud to the group, and place the card on the correct crop on the game board.
4. The judge will check the answer key and announce if the player was correct or not.

CROP CLUES AND ANSWER KEY

SUNFLOWER
Ranked #1 in 1982 production
Bees pollinate them
A colony of flowers
Oil or seeds
Confectionary birdseed

SUGAR BEETS
Ranked #4 in 1982 production
Boiled and refined for sugar
Requires some manual labor
An annual plant
Grown in Red River Valley
Pulp used for livestock

WHEAT
Ranked #1 in durum in 1982
Ranked #1 in spring wheat in 1982
Second in overall production
"Staff of life"
Storehouse of nutrients
Grown worldwide
Amber waves of grain
Endosperm
Bran
Germ
Semolin
Macaroni
Pasta

SOYBEANS
Meat substitute
Source of protein
Really a grain
Vegetable oil and meal for livestock
Legumes

FLAX
First in production in 1982
Linseed oil
Cloth
Cotton gin slowed production
Blue and white fields

POTATOES
#7 in production in 1982
Processed into chips, flakes, flour
French fries
Alexander Henry brought first seeds
First crop planted by early ND settlers

BARLEY
Malting
Cereal feed
First in production in 1982
First cereal cultivated by man
Beer, malted milk, cereal

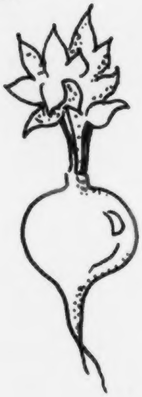
OATS
Best grain for horses
Oatmeal and other breakfast cereal
Starch and proteins
Pilcorn

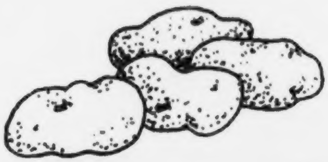
CORN
Livestock feed
Hogs, cattle, sheep, poultry
Fats, proteins, carbohydrates
Dextrose
Silage

RYE
Livestock feed, flour, paper
Dark, heavy bread
Cover crop
A grain that pollinates

HAY
Alfalfa and clover
Windrows
Baler
Swather
Made from grasses

DRY EDIBLE BEANS
Navy
Pinto
Exported to Mexico
5th in 1982 production



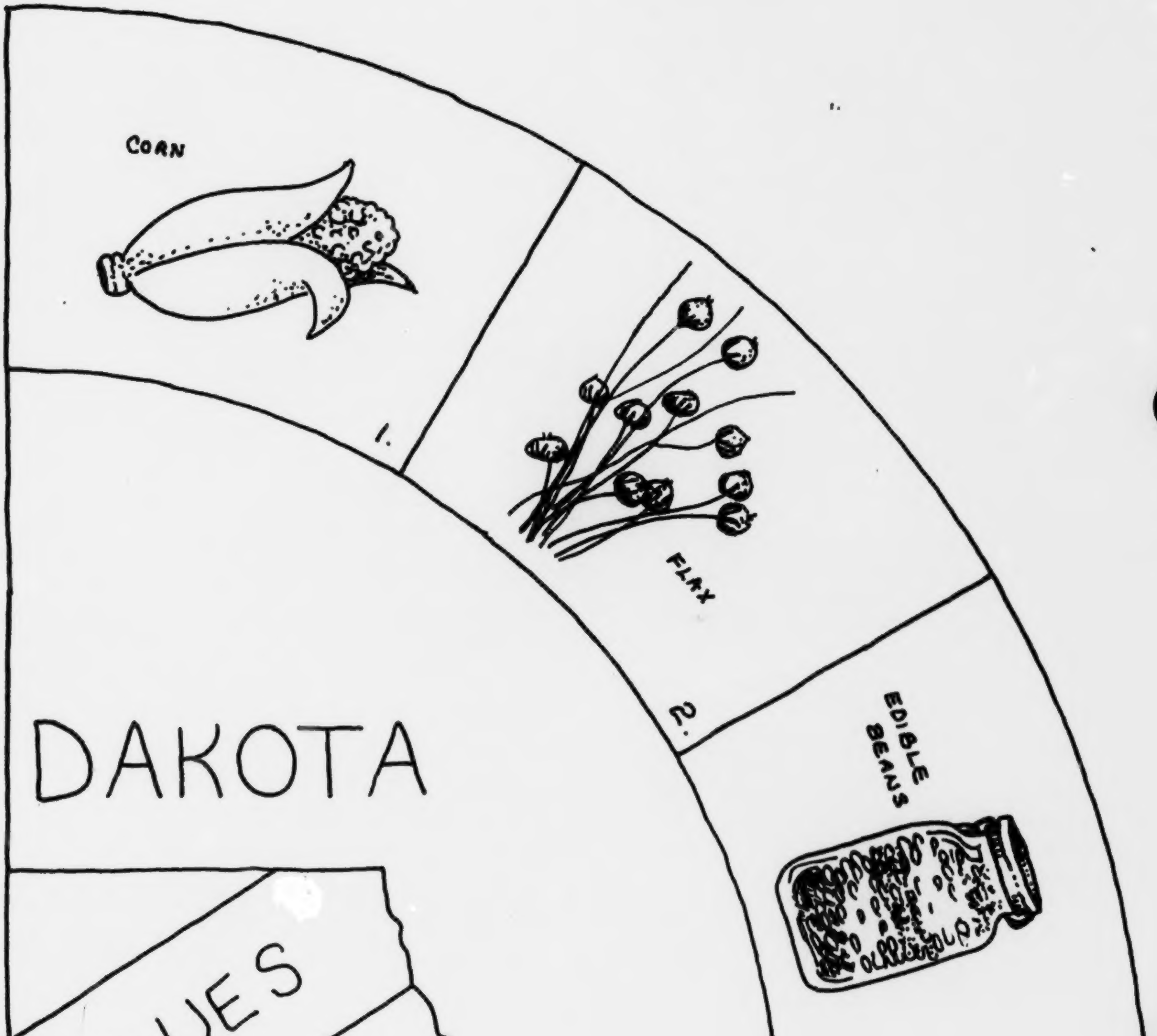


CROP CLUE continued

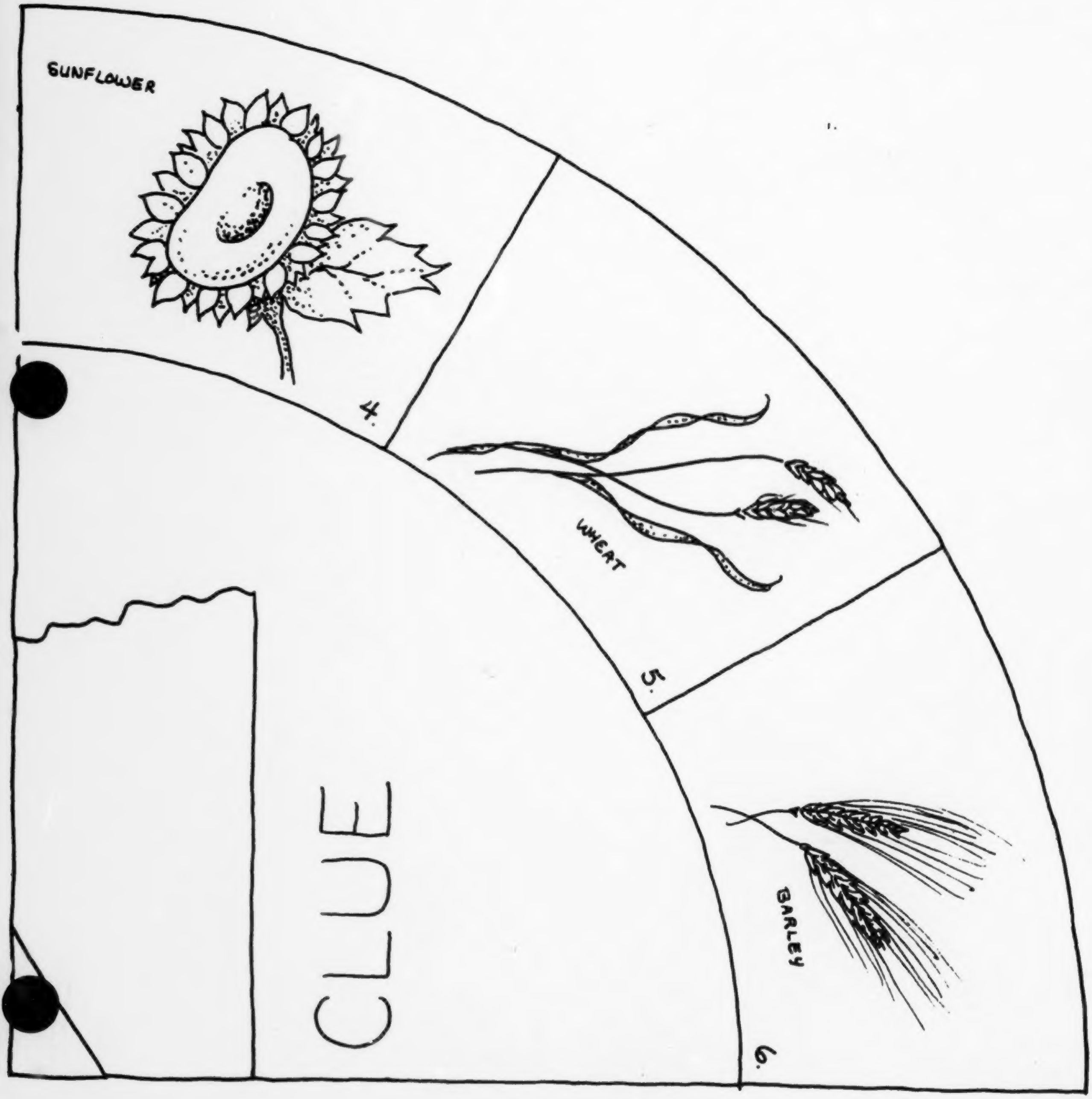
Crop Clue directions continued

A) if correct, the player keeps the clue card.
B) if incorrect, the player puts the clue card at the bottom of the crop clue stack.

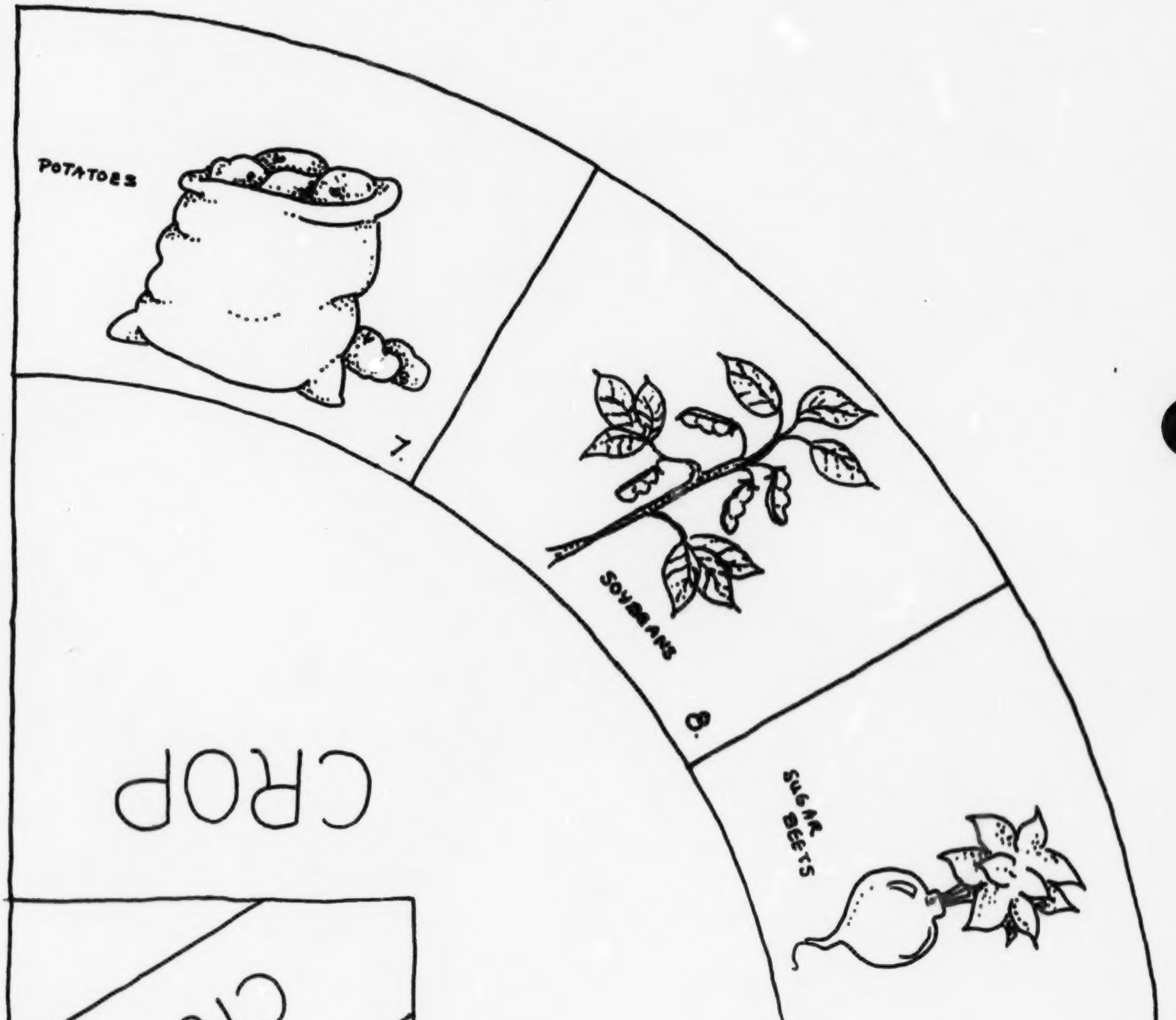
5. The player with the most clue cards at the end of the game is the winner.


CORN
1.
FLAX
2.
EDIBLE BEANS
3.
DAKOTA
CLUES

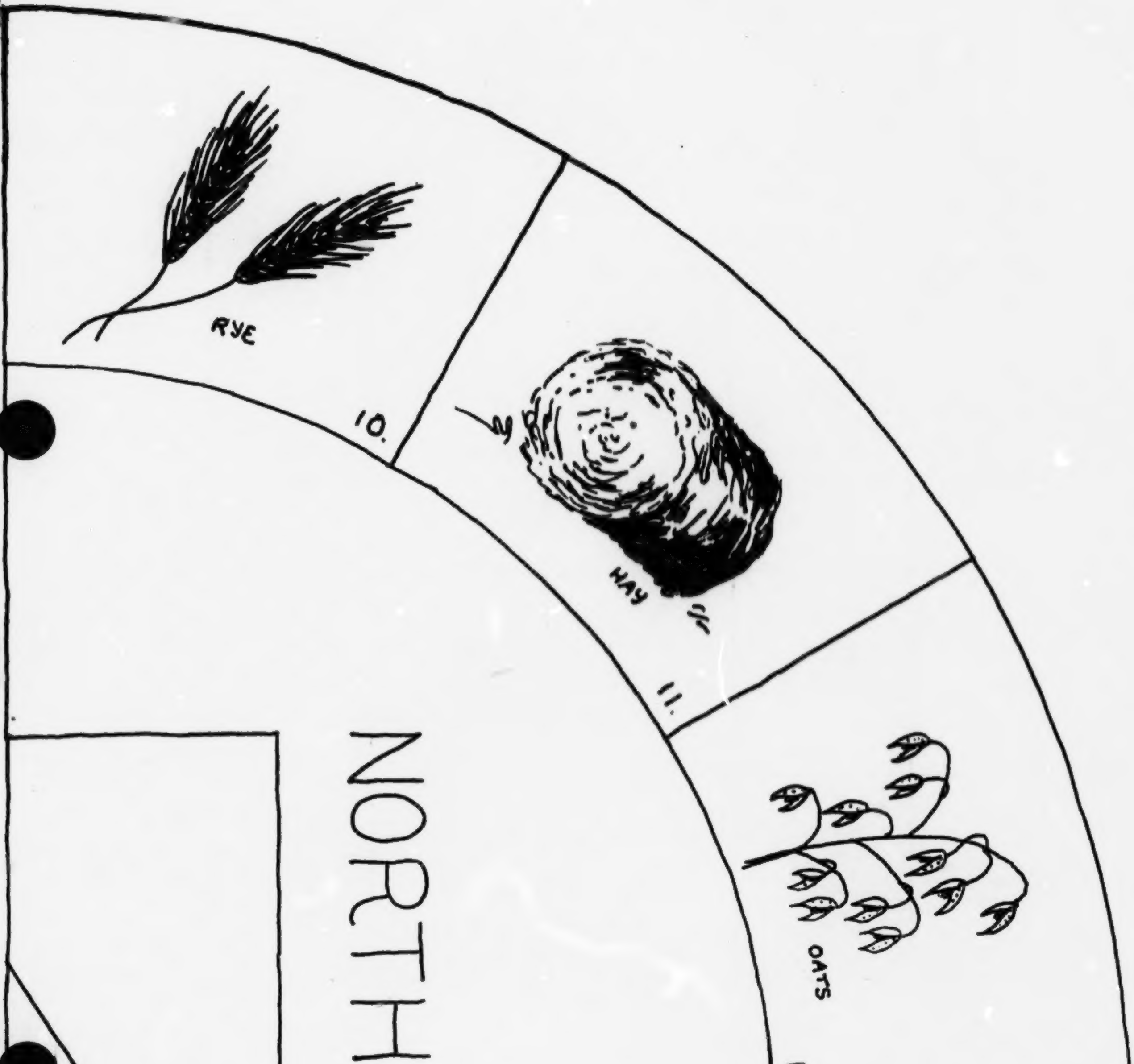
CROP CLUE GAME continued


SUNFLOWER
4.
WHEAT
5.
BARLEY
6.
CLUE

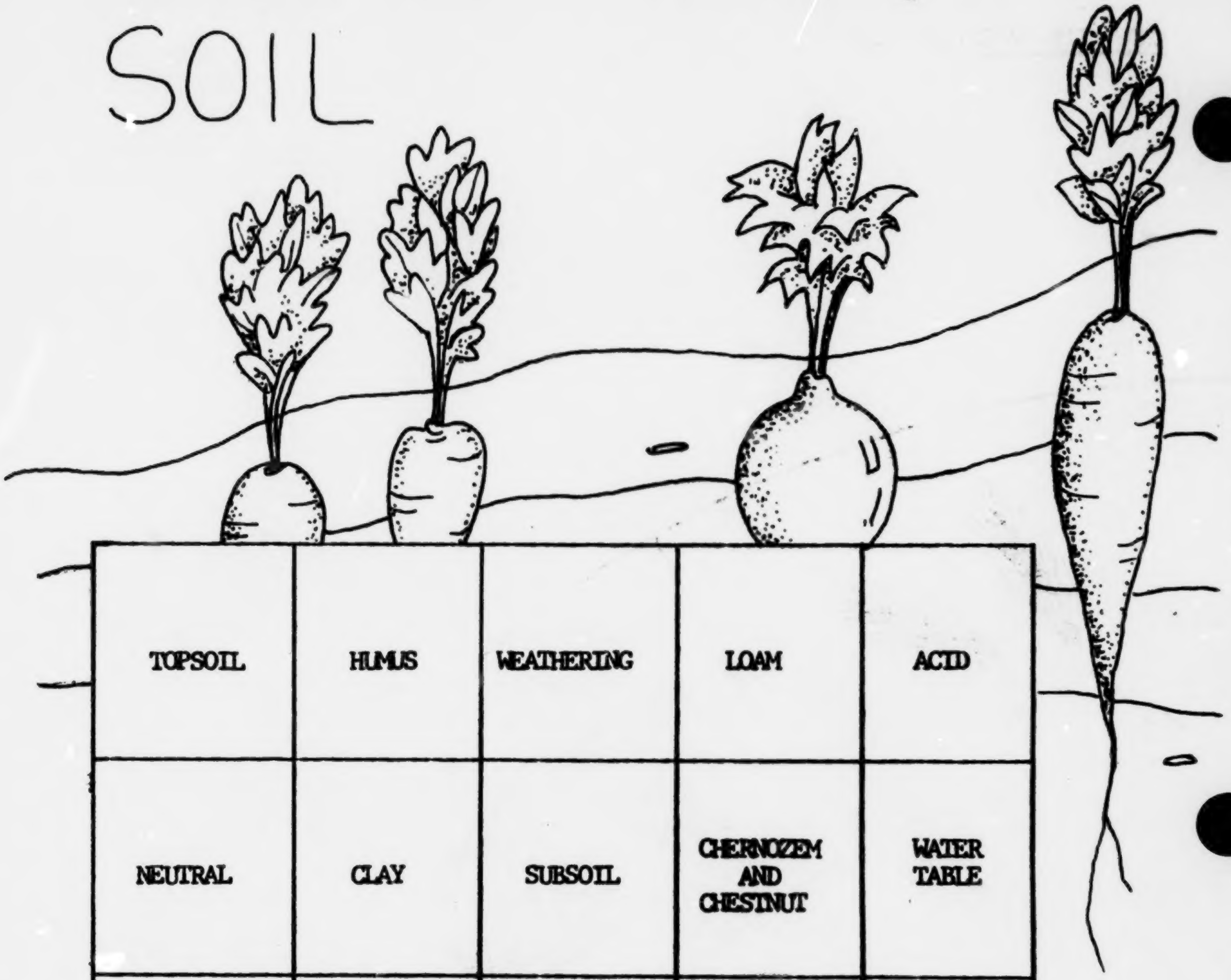
CROP CLUE GAME continued


POTATOES
7.
SOYBEANS
8.
SUGAR BEETS
9.
CROP
CROP

CROP CLUE GAME continued


RYE
10.
HAY
11.
OATS
12.
NORTH

SOIL

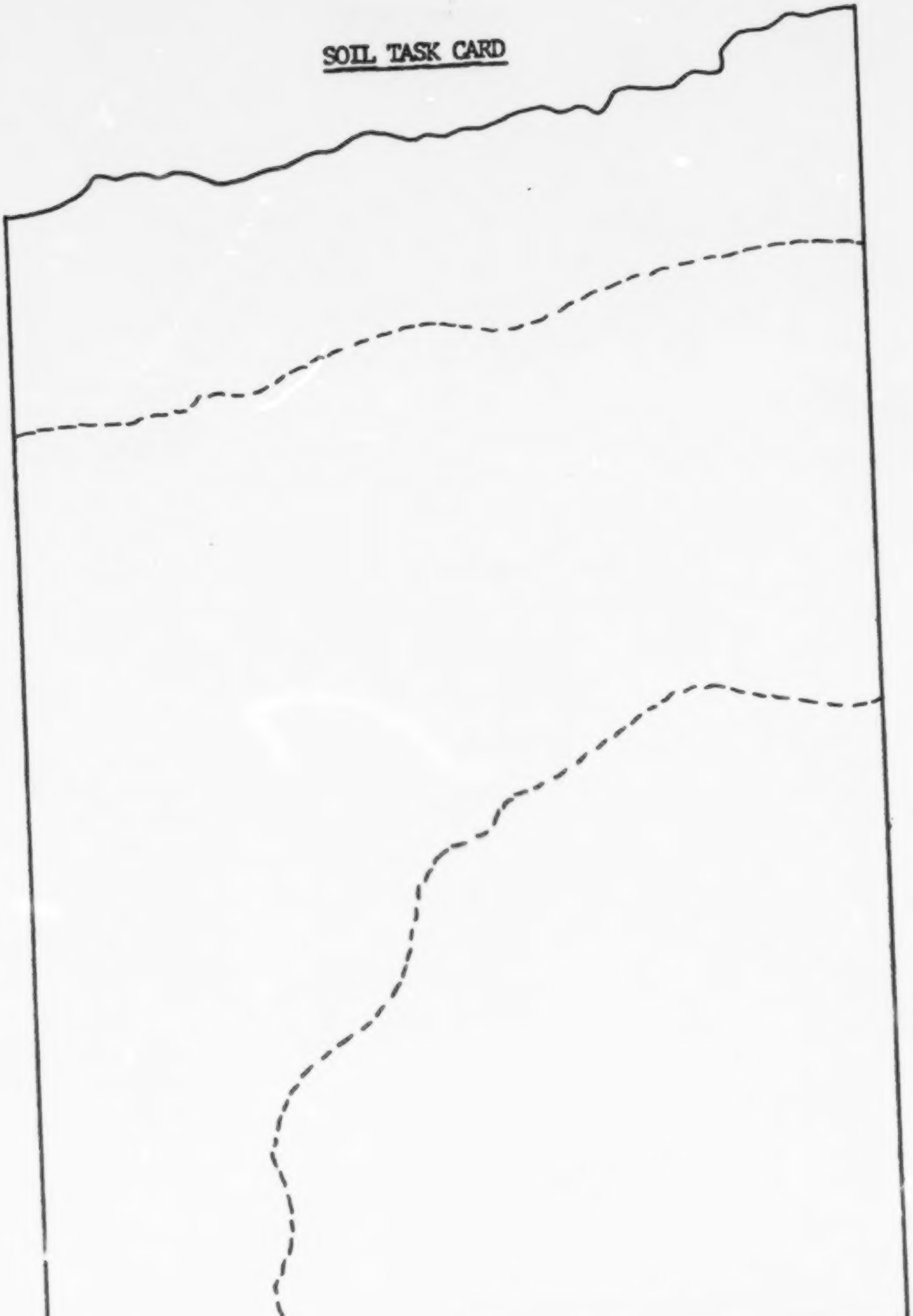


TOPSOIL	HUMUS	WEATHERING	LOAM	ACID
NEUTRAL	CLAY	SUBSOIL	CHERNOZEM AND CHESTNUT	WATER TABLE
FLY-OFF	CROP ROTATION	ALKALINE	FALLOW SYSTEM	RUN-OFF
CHERNOZEM	SAND	BEDROCK	CHESTNUT	SILT

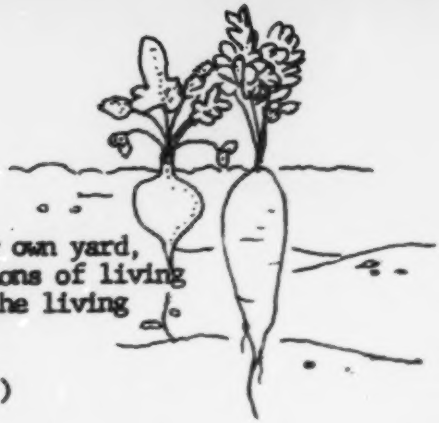
SOIL
(Definition Cards)

The top and most fertile layer	Material from decaying plants and animals	Breaking up of rock by nature	Soil made up of sand, clay, silt, and humus	Soil containing acid
Soil that's neither acid nor alkaline	Smallest soil particles	Mostly rock particles	Main soil types of Drift Prairie	Level at which water stands in the ground
Water that evaporated as it hits the ground	A way of keeping the soil from wearing out	Soil containing alkalies	Let the land lay idle a year	Water that runs down slopes into ponds, lakes and streams
Main soil type of Red River Valley	Largest soil particles	Underlying rock	Main soil type of Missouri Slope	Soil particles larger than clay and smaller than sand

SOIL TASK CARD



SOIL ACTIVITIES



1. If you grabbed a handful of soil from a field or your own yard, it wouldn't look like much but yet there may be millions of living things in just that small amount. What are some of the living things found in the soil?

   (Green plants, earthworms, bugs, bacteria, mold, etc.)

2. Plants and animals that do not live in the soil still depend on the soil and its living things. Explain several ways man depends on the soil.

   (Planting and harvesting food, taking minerals from the soil, building on the soil, building products from the soil--wood, sod, brick, sand, stone, and spending most of one's life on the soil)

3. It's been said that we are throwing our gold into the sea--the gold being our soil. Why would the erosion of soil to the ocean be compared to the loss of valuable gold?

4. Plants are dams. Explain this statement in relationship to the soil.

   (Holds back water, soil has more time to absorb water, and prevents erosion)

5. Most soil is made up of small bits of rock that have broken up from solid rock. No matter how hard rock is, it can all be broken up in time. Research and describe ways solid rock becomes soil.

   (Trees break up rock, wind, water, temperature changes, ice, earthworms grind up small rocks)

6. Soil erosion is the wearing away of topsoil by wind and water. It can be a good thing if worn out areas receive the good soil. But if erosion occurs in fields without crops, the farmer is losing valuable topsoil. Food grown on eroded soil lacks in vitamins and minerals. Study about soil and erosion in the encyclopedia. Describe the different ways erosion takes place in North Dakota. The Badlands in southwestern North Dakota are a prime example of this.

SOIL ACTIVITIES CONTINUED

7. Illustrate a book showing wind and water erosion of good topsoil. Include preventive measures that can be used to help stop erosion. This might include: crop rotation, strip farming, shelterbelts, and summer fallow.

8. Soil provides a place for plants to anchor their roots and be held in place to receive sunshine and air in order to grow. But, soil does much more than just that! It also supplies plants with water and minerals, two very necessary ingredients in the growth of plants. Check out some books on soil and compile a list of elements that different plants must get from the soil.

   (Oxygen, hydrogen, carbon, nitrogen, sulfur, phosphorus, potassium, iron, calcium, magnesium, copper, zinc, boron, manganese, etc.)

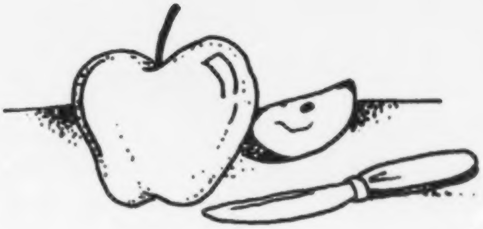
9. Soil is one of our planet's most important resource. Evaluate why this is true for North Dakota.

10. North Dakota has the best soil of any other state in the United States. Explain what the following statement means to our state.

    "THE BEST SECURITY IS SOIL SECURITY"

11. Read about soil in the 1979 Project Study book entitled, Natural Resources of North Dakota, pages 3-5. Collect samples of the three kinds of rock particles--sand, silt and clay--and display them.

A SLICE OF SOIL



SUPPLIES: a large apple
a paring knife

INTRODUCTION: One of the most important natural resources that covers much of the earth's land surface is soil. All living things depend on it as a source of food, either directly or indirectly.

Our food producing land remains the same and yet the world population continues to grow. Consequently, each person's food portion becomes smaller and smaller. It is the responsibility of this generation to use the soil wisely so to insure the future. The following demonstration will show how little of the earth's surface is actually used for food production as compared to growing populations.

PROCEDURE: 1. Cut the apple into four equal parts. Three parts represent the oceans of the world. The fourth part represents the land area.

2. Cut the land section in half lengthwise. Now you have two one-eighth pieces. One section represents land such as deserts, swamps, antarctic, arctic, and mountain regions. The other one-eighth section represents land where man can live but may not grow food.

3. Slice this one-eighth section lengthwise into four equal parts. Three of these one-thirty second sections represent the areas of the world which are too rocky, too wet, too hot, or where soils are too poor for production, as well as areas developed by man.

4. Carefully peel the last one-thirty second section. This small bit of peeling represents the soil of our earth on which mankind depends for food production!

5. Questions for class discussions:

- What if this valuable top soil upon which Man depends should suddenly disappear? ....What then?
- What will happen if the world's population continues to grow while our earth's top soil remains the same?
- What ways can you and your family help conserve precious soil in your own backyard?

Another idea:

- Invite a local soil conservation person into your classroom to discuss what special things are being done to save the soil; or
- Make a graph based on this lesson, depicting the portion of land used to grow our food versus all the other areas of the world such as water or land regions.

THREE STEPS: NORTH DAKOTA TOPOGRAPHY

SUPPLIES: Project Study Booklet, Geology, Geography and Climate of North Dakota (one for each student)
Topography fact sheet
Construction paper
Scissors
Glue

INTRODUCTION: As one travels across the state, many changes take place in the topography. Some of those changes are quite dramatic while other changes are more subtle. North Dakota has three natural divisions each with their own soils, land forms, elevations and history. They are: 1) Red River Valley; 2) Drift Prairie; 3) Missouri Plateau. The agricultural contributions of the three regions are also varied.

PROCEDURE:

1. Read together or allow time for silent reading of pages 12-22 in the Geology, Geography and Climate of North Dakota, Project Study Booklet. (Most books about North Dakota contain information about the three regions in case you do not have access to the Project Study Booklet).

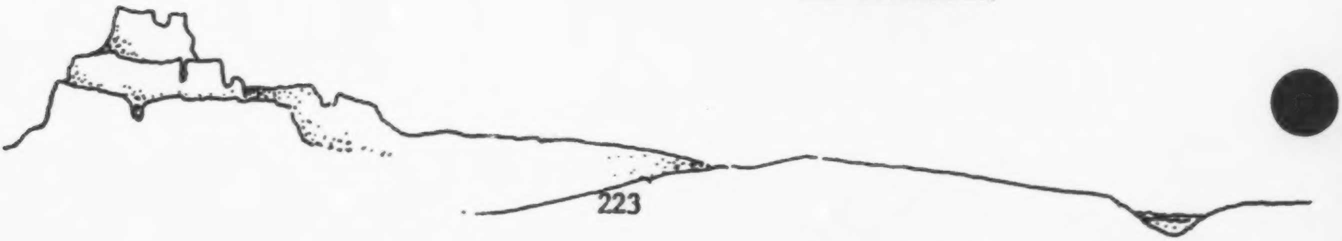
2. Discuss the major differences and unique characteristics of each area in relation to the agriculture of our state.

   -What are the major agricultural contributions of each area?
   -Name some major geographical landmarks in each region.
   -In what ways are the three region's topography different? Alike?
   -What are the major soil types of each region?

3. Distribute the Topography Fact Sheet to the students. Go over the directions and allow time to complete the activity.

ANOTHER IDEA: Challenge the students to make their own "word title facts" for each region. Encourage them to make agriculture the main emphasis.

ANOTHER IDEA: Use the "word title facts" with other agricultural related terms such as; crops, machinery, counties (emphasizing crops and livestock of that area), and livestock.



THREE STEPS: NORTH DAKOTA TOPOGRAPHY

Topography Fact Sheet

DIRECTIONS:

1) Complete each fact in each strip by filling in the blank space with the correct letter.

2) Cut the fact strips apart.

3) Divide the strips into three groups according to the region you think they belong in.

4) If the facts are grouped correctly they will spell the region's name when the letters you filled in are lined up vertically.

5) Mount the three region "word title facts" on construction paper.

** Be sure to leave spaces between the words in each region's name so it is easily read.

SURFACE OF GLAC_AL DEPOSIT OR DRIFT

CONTAINS _ERY RICH SOIL

ELEVATION 2,000 F_ET ABOVE SEA LEVEL

KILLDEER M_UNTAINS

INTERNATIONAL _EACE GARDENS

CO_N

GLACIERS FORMED _AKE AGASSIZ

LITTLE _ISSOURI RIVER

THE MID_LE STEP IN NORTH DAKOTA

TOPOGRAPHY FACT SHEET continued

MOST _ASTERN REGION

MANY SMALL L_KES, PONDS AND SWAMPS

ELEVA_ION OF 1,000-2,000 FEET

ODD SHA_ED HILLS AND BUTTES

SOUTHWE_T REGION

SUGA_ BEETS

ONCE COVERE_ WITH TALL GRASSES

COVERS 400 SQUARE M_LES IN NORTH DAKOTA

SHORT PR_IRIE GRASSES

_EW RIVERS

SEA L_VEL 1,000 FEET

THEODORE ROOSEVELT NAT_ONAL PARK

POTATO_S

LITTLE E_OSION

S_EEP VALLEYS

ICELAND_C STATE PARK

PLATEAU RI_ES SLOWLY TO THE WEST

DEV_LS LAKE

TOPOGRAPHY FACT SHEET continued

C_TTLE RANCH LANDS

"THE BRE_D BASKET OF THE WORLD"

UNTO_CHED BY GLACIERS

LOWEST E_EVATION

CHE_NOZEM AND CHESTNUT SOIL

REGION CARVED BY E_OSION FOR MILLIONS OF YEARS

FLAT VALLE_

CHE_NOZEM SOIL

_OLLING PLAINS

CHESTN_T SOIL

BAD_ANDS

FERTILE RI_ER VALLEY

WH_AT

H_GHEST POINTS IN NORTH DAKOTA

TOPOGRAPHY FACT SHEET
Answer Key

CHERNOZEM SOIL

MOST EASTERN REGION

ONCE COVERED WITH TALL GRASSES

CORN

ICELANDIC STATE PARK

CONTAINS VERY RICH SOIL

SEA LEVEL 1,000 FEET

SUGAR BEETS

FERTILE RIVER VALLEY

"THE BREAD BASKET OF THE WORLD"

LOWEST ELEVATION

GLACIERS FORMED LAKE AGASSIZ

POTATOES

FLAT VALLEY

* *

THE MIDDLE STEP IN NORTH DAKOTA

ROLLING PLAINS

SURFACE OF GLACIAL DEPOSIT OR DRIFT

FEW RIVERS

ELEVATION OF 1,000-2,000 FEET

TOPOGRAPHY FACT SHEET Answer Key continued

INTERNATIONAL PEACE GARDENS

LITTLE EROSION

MANY SMALL LAKES, PONDS AND SWAMPS

DEVILS LAKE

CHERNOZEM AND CHESTNUT SOIL

COVERS 400 SQUARE MILES IN NORTH DAKOTA

WHEAT

* *

LITTLE MISSOURI RIVER

THEODORE ROOSEVELT NATIONAL PARK

PLATEAU RISES SLOWLY TO THE WEST

SOUTHWEST REGION

KILLDEER MOUNTAINS

UNTOUCHED BY GLACIERS

REGION CARVED BY EROSION FOR MILLIONS OF YEARS

HIGHEST POINTS IN NORTH DAKOTA

ODD SHAPED HILLS AND BUTTES

BADLANDS

CATTLE RANCH LANDS

STEEP VALLEYS

ELEVATION 2,000 FEET ABOVE SEA LEVEL

SHORT PRAIRIE GRASSES

CHESTNUT SOIL

NORTH DAKOTA: A MARSHMALLOW LAND
(Science project)

SUPPLIES: marshmallows cylinder (or tall, narrow jar) weights (or any small objects suitable as weights)

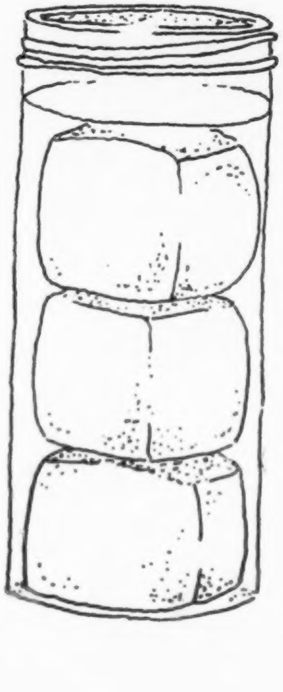
INTRODUCTION: Earth scientists tell us that the land as we know North Dakota today was not always as it is now. In fact, North Dakota was not even land at all, but rather a sea! More than once the land pushed up and the sea went back. Then the process would repeat with erosion starting over again. This entire cycle took thousands, maybe millions of years.

Then, strange but true, an unusual thing occurred! Snow began to fall in northern North America, and never quit. More snow fell during the winter than could melt in the summer. Snow fell upon snow, and the mass that formed was called a glacier.

PROCEDURE:

1. Ask the students to think what happens when you pack snow into a tight ball? What is formed? (Ice) How is this similar to the formation of a glacier? (Steady snowfall compacts into layers of ice)

2. Conduct the experiment to show how glaciers were formed:



A) Fill a graduated cylinder or tall jar with marshmallows stacking them one on top of another. The jar diameter should be slightly larger than the marshmallows.

B) Cut a cardboard disk slightly larger than the marshmallows so that it fits snuggly in the jar and place it on top of the stack.

C) Make sure the cylinder or jar is marked up one side with inch or centimeter units. You may need to add your own measurement with a piece of tape and a marker.

D) Place weights on the cardboard and observe what happens as you continue to add additional weight?

E) Questions and conclusions:

-What is compression?
-Are all the marshmallows equally compressed?
-Does the number of marshmallows in the jar affect the results?
-What analogy can be drawn to the relationship between the compressed marshmallows and the glaciers of North Dakota?

ND: A MARSHMALLOW LAND continued

3. Think of ice being compacted in the same way as the marshmallows. What do you think happened to the bottom layers of the ice mass? (Great pressure moves it out and forward)

4. What happened to the land of North Dakota as the giant ice mass moved into our state? (As the glaciers melted, they left lakes, river valleys that help make some of North Dakota's best crop land t [illegible])

ANOTHER IDEA:

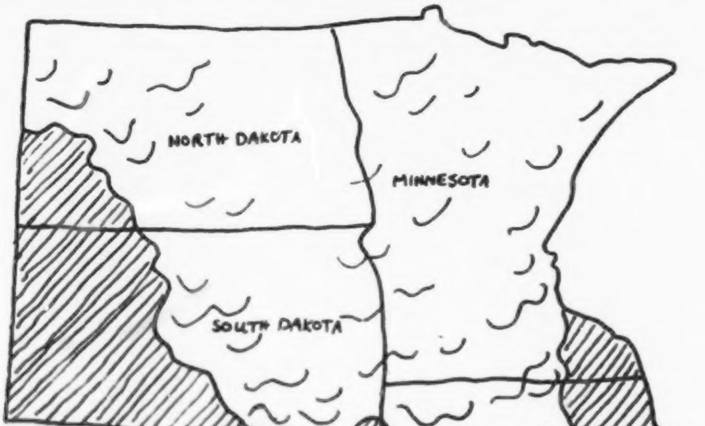
1. Why not make home made marshmallows as a culminating activity to this experiment? The recipe can be located on page 96 of the "Tear-Me-Out" section from the book, Student Learning Centers: A New Approach to Teaching North Dakota Studies. (There should be one in your building).

2. North Dakota was the beneficiary of the glacier. Write an article for the Grassroots Reporter about the glacial drift and its importance to our agriculture.

3. Research Louis Agassiz, the "glacier detective." He tried to prove that glaciers not only move but also grow. He researched these questions and problems related to glaciers:

   A) The cause
   B) The changes that occur
   C) Changes to land surface
   D) Movement
   E) Growth

4. Locate a map of the extent of the continental glaciation over North America and share it with your class.



THE MAKEUP OF SOIL
(Science project)

SUPPLIES: Jars litmus paper soil samples

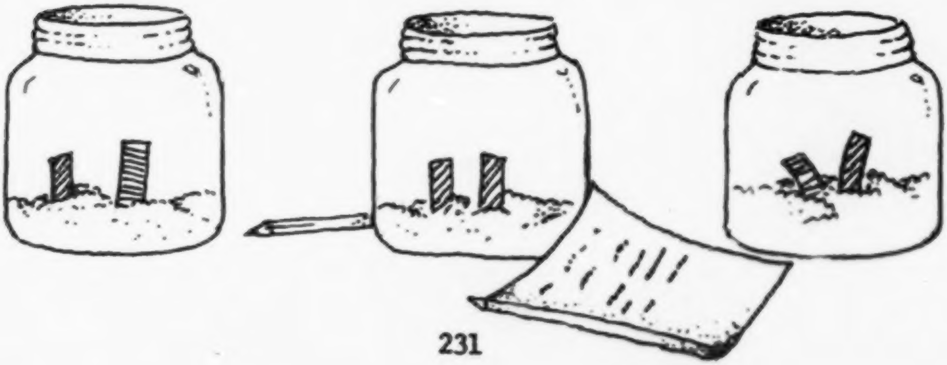
INTRODUCTION: The chemistry makeup of soil can be acidic, alkaline, or neutral. Test some samples from around your area to determine their chemistry makeup.

PROCEDURE: Place a strip of pink and a strip of blue litmus paper in a number of jars and add a soil sample to each jar. Put in enough water to make the paper wet. Observe the color of the litmus paper and record the results on the chart provided.

NOTE: If blue litmus turns pink = acidic soil
If pink litmus turns blue = alkaline
If neither paper changes color = neutral

CHEMISTRY OF THE SOIL

Sample	Location where soil sample was taken	Blue litmus color change	Pink litmus color change	Chemistry of the soil



CHEMICALS; THE FARMER'S FRIEND
(Word definition match)

Since 1910 the acreage used to grow crops has not increased; yet, millions more are being fed because of the increased productivity from every acre. The use of chemicals in agriculture has made an important difference. Pesticides help control insects, weeds and diseases. Without the use of pesticides, crop production could drop and food prices could jump 50 - 75 percent! (Could you imagine paying $1.75 for the same loaf of bread you are used to paying $1.00 for?)

* *

Draw a line to the correct definition of each word below. You may use your dictionary or encyclopedia to help you if necessary. These terms are commonly known in connection with chemicals.

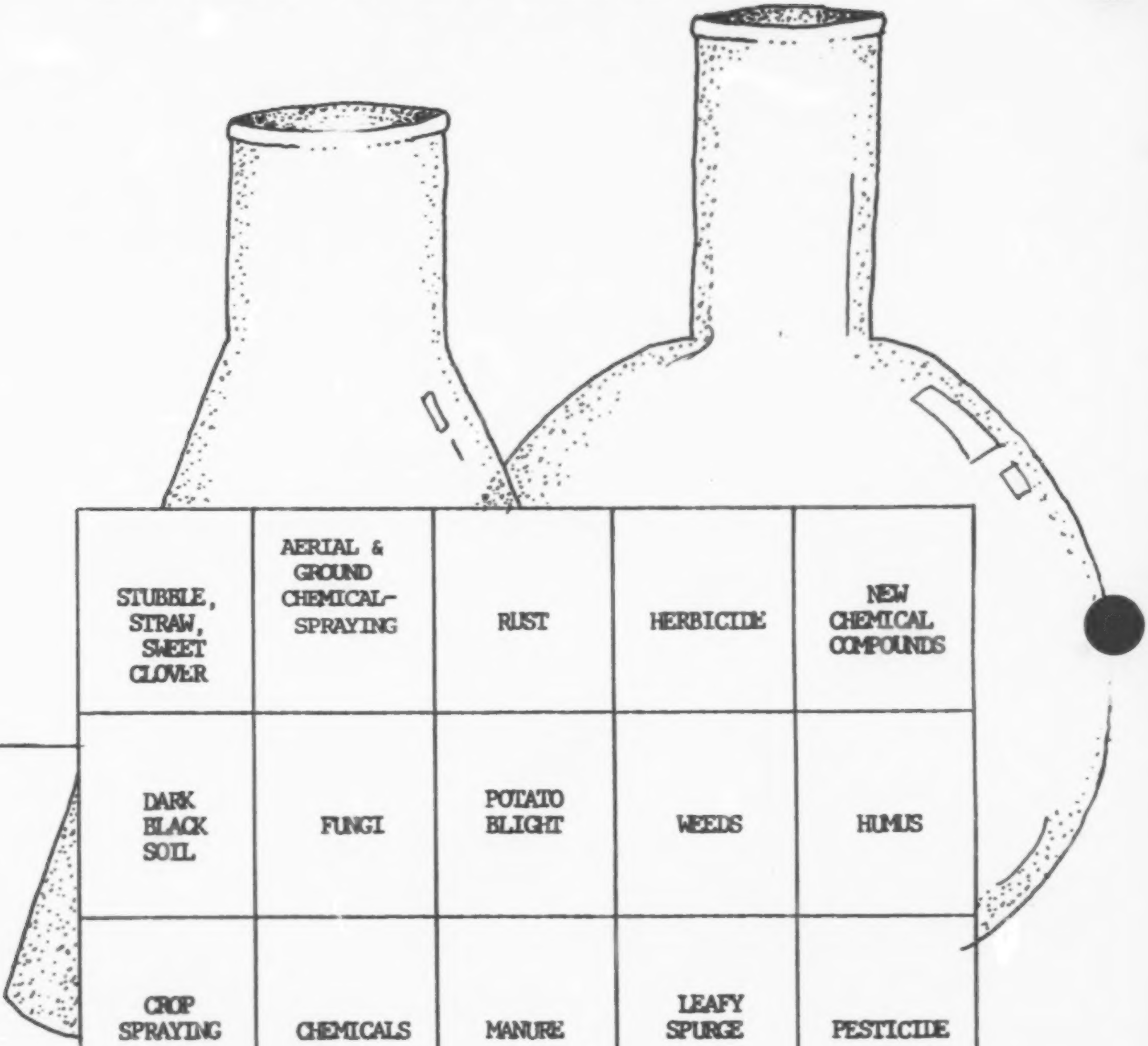
1.	Fertilizer	A grain-killing fungi
2.	Nutrients	A weed
3.	Manure	A chemical which kills fungi (disease)
4.	Grasshoppers	A substance that puts nutrients into the soil
5.	Chemical	A chemical which kills insects
6.	Insecticide	Crop-destroying insect
7.	Herbicide	Biological Control Agent
8.	Fungicide	Fertilizers or pesticides
9.	Pesticide	Essential for growth
10.	Leafy Spurge	Waste used to fertilize soil
11.	Potato Blight	A chemical which kills weeds
12.	Organic Farmer	One who uses no commercial fertilizers or pesticides on his farm
13.	BCA	A fungi
14.	Rust	A chemical which kills any pests of a crop

(answers found on page 263)

N To develop a new crop protection chemical, researchers need N
O up to eight years and may spend about $35 million dollars. O
T This cost does not include the cost of a manufacturing T
E plant! E

* * *

CHEMICALS

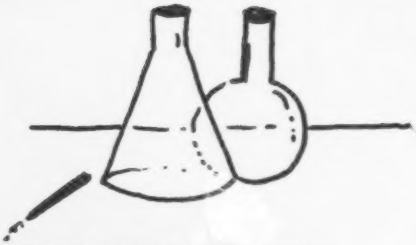


STUBBLE, STRAW, SWEET CLOVER	AERIAL & GROUND CHEMICAL-SPRAYING	RUST	HERBICIDE	NEW CHEMICAL COMPOUNDS
DARK BLACK SOIL	FUNGI	POTATO BLIGHT	WEEDS	HUMUS
CROP SPRAYING	CHEMICALS	MANURE	LEAFY SPURGE	PESTICIDE
INSECTICIDE	ORGANIC FARMING	GREEN MANURE	FUNGICIDE	APPLICATION

CHEMICALS
(Definition Cards)

Crops plowed under to improve soil structure	Methods to apply pesticides	A disease that can ruin cereal crops	Sprayed on weeds to control them	Are being continually developed
High in organic material	Causes disease on plants	Can ruin a field of potatoes	Compete with crops for food, water and space	Organic material
A method by which chemicals are applied	Helps farmers increase crop production	Waste used to fertilize soil	A weed which has infested many acres in N.D.	Any chemical used to rid pests (rodents or insects)
Chemical used to suppress insect populations	No use of commercial fertilizers or pesticides	Plowing under a grown crop	Coats a plant and protects it from fungi	Timing is one of the keys

CHEMICAL CONTROL
(Analysis/evaluation)



SUPPLIES: Pro and Con Answer sheet
Chemical activity sheet
scissors
glue

INTRODUCTION: In 1970, Dr. Norman Borlaug, a United States agronomist, was awarded the Nobel Peace Prize. He stated, "If we say that pesticides and fertilizers cannot be used, then we can simply say that we cannot produce enough food. The people of the world must decide that either we use agricultural chemicals and use them wisely in the right amounts and the right kinds to produce the food we need, or we will starve."

Modern agriculture relies on chemicals to help produce its abundant food. Chemicals have helped farmers overcome barriers to production. However, pests can become resistant to chemicals and continue to multiply. New chemical compounds are continuously being developed to keep ahead of the pests.

PROCEDURE:

1. Generate a class discussion about the use of farm chemicals. How do chemicals help the farmer?
   - -When can chemicals be dangerous?
   - -Do the benefits of using chemicals outweigh the risks?
   - -Why is the public often fearful as to the use of chemicals?
2. Pass out the students' Statement sheet along with the Activity sheet to be completed.
3. If necessary, discuss the meaning of a pro or con statement.
4. Cut these statements apart. Separate the pro statements from the con statements. Glue the Statements onto the Activity sheet in the correct column provided.
5. Answer key to the Chemical Activity sheet. The order of the statements under each column is not a factor as long as they divided the statements correctly.
6. Follow up this activity with this closing discussion. Proper use of farm chemicals is the responsibility of the farmers, the home owners, the chemical industry and the government. What are some ways that these responsibilities are being met? What improvements might be made?

Farmer, Home Owner and Applicator

- — should read, understand and follow the pesticide label
- — should dispose of empty pesticide cans, safely and properly

Chemical Industry

- -- following government regulations
- — proper labeling and packaging
- — research to discover, develop and register new crop pesticides

Government

- — restricts the use of pesticides
- — regulates the use of pesticides
- — investigates pesticides for enforcement purposes
- -- decides the use of pesticides on a benefit/risk basis

STUDENTS: Pesticides are NOT things to play with!

Another idea: You may wish to have your students engage in a research project. Have them list both the benefits and risks involved in using such things as —

herbicides
insecticides
rodenticides
fungicides
fertilizer

CHEMICAL ACTIVITY SHEET

PROS	CONS

DIRECTIONS: Place the following statements under the right heading, above.

Suppress insect populations

Keep plants free of disease

Spray drift could harm plant life

Increases crop production

Could lower crop production costs

Could harm fish in streams if not applied properly

Could kill bees working in fields being treated

Keeps animals healthy

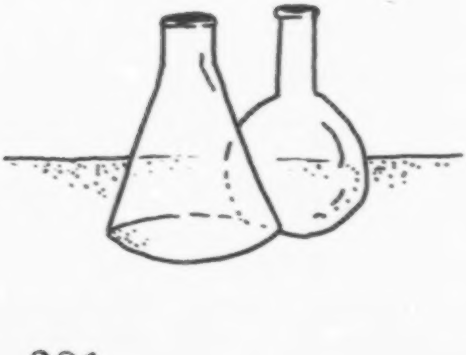
Helps correct soil deficiencies

Protects plants from weed competition

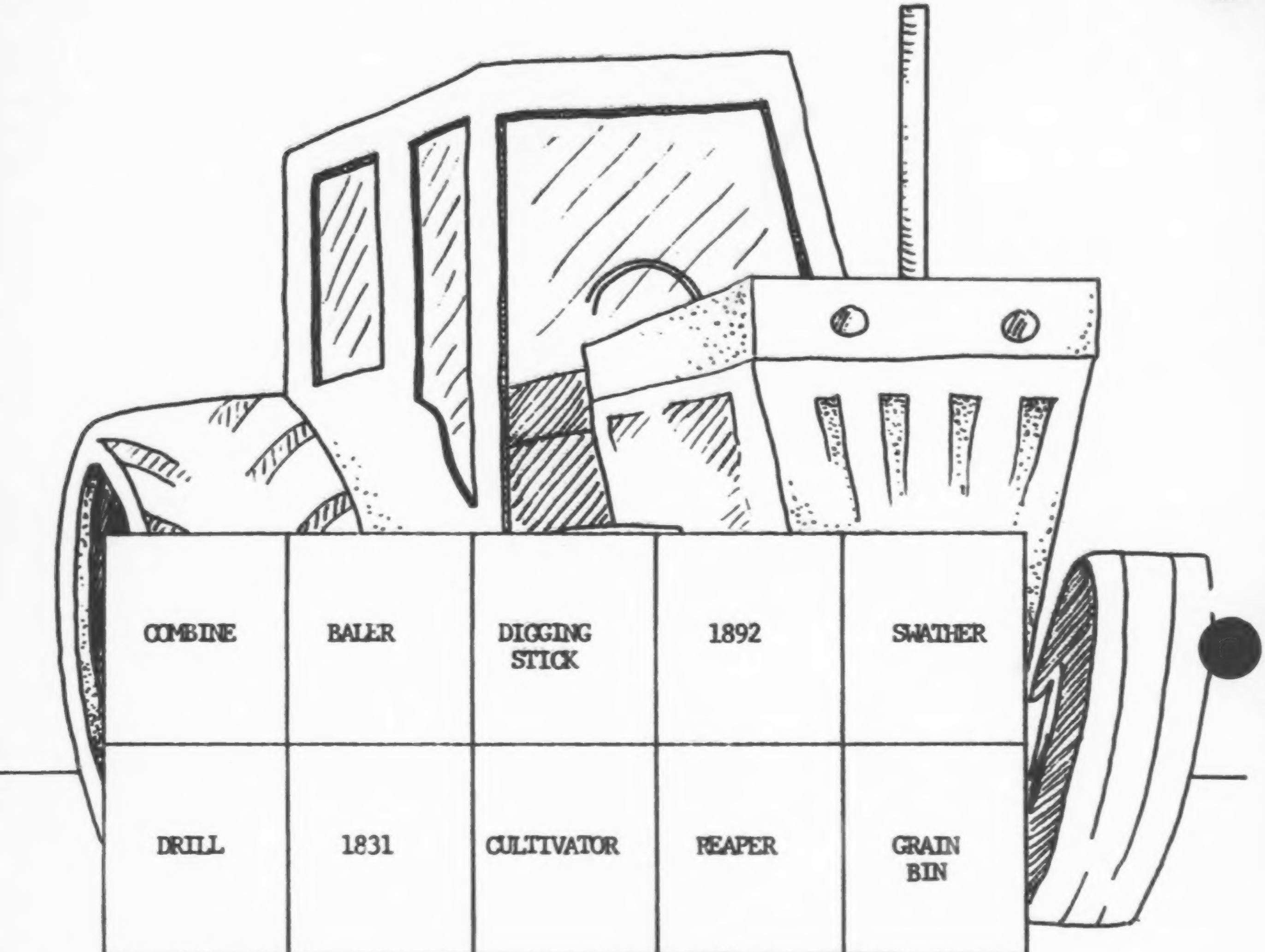
Could hurt organisms not meant to be harmed

CHEMICAL ANSWER SHEET

PROS	CONS
Keeps animals healthy	Could harm people, birds, wildlife
Could keep plants free of disease	Spray drift could harm plant life
Protects plants from weed competition	Could harm fish in streams properly
Increases crop production	Could hurt organisms not meant to be harmed
Suppress insect populations	Could kill bees working in fields being treated
Helps correct soil deficiencies	
Could lower crop production costs	



MACHINERY

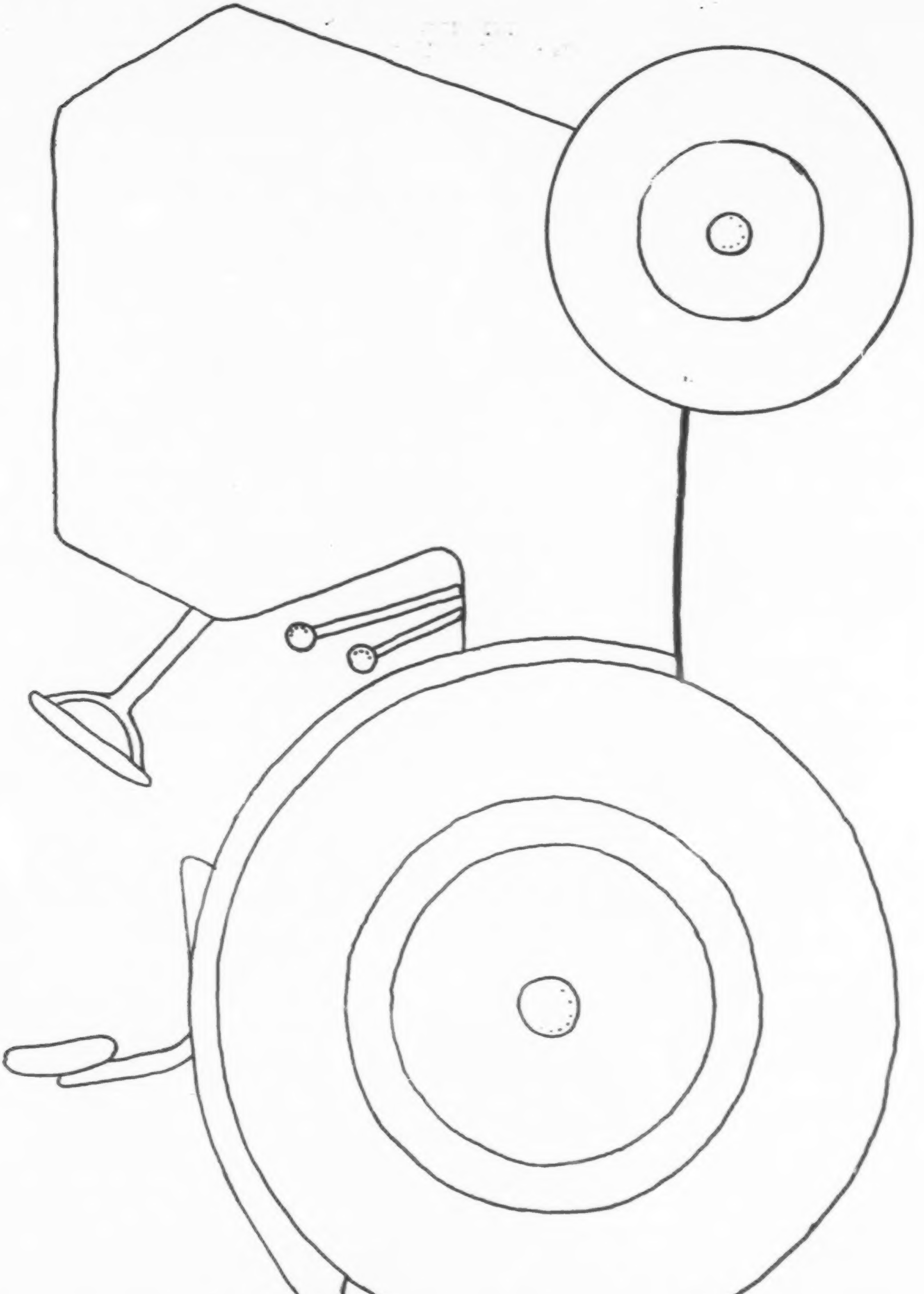


COMBINE	BALER	DIGGING STICK	1892	SWATHER
DRILL	1831	CULTIVATOR	REAPER	GRAIN BIN
AUGER	TRACTOR	TELEPHONE RADIO TELEVISION	1993	COMPUTER
HARROW OR DISK	SPRAYER	GRAIN TRUCK	STEEL PLOW	GRAIN DRYER

MACHINERY
(Definition Card)

machine that performs 5 basic jobs in harvesting	makes hay or straw bales	tool used for centuries to plant crops	successful gasoline tractor was built	cuts or mows the crop in the field
plants the seeds	Cyrus McCormick invented the reaper	pulled rolls of crops to loosen dirt and destroy weeds	steam powered harvesting machine	building for grain storage
a screw conveyor that moves grain into the bin	pushes or pulls a tool or machine over the land	keeps the farmer informed of agricultural related news and bulletins	Eli Whitney invented the cotton gin	latest equipment available on the farm today
consists of sharp teeth or disks that break up and even off plowed ground	spreads chemicals onto the crops	vehicle used to carry goods to market	John Deere's invention which turned N.D. from grassland to farmland	dries grain for storage

MACHINERY TASK CARD



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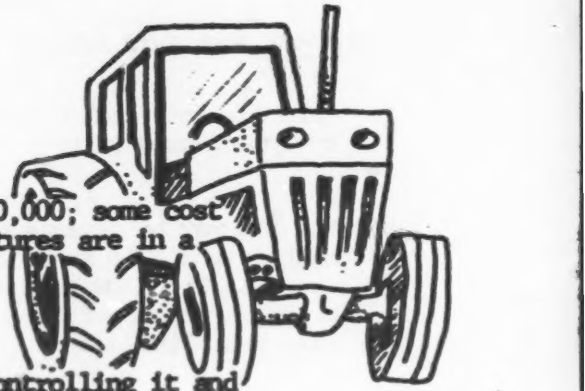


MACHINERY
Task Card Activities

1. A powerful 8-wheel tractor can cost as much as $50,000; some cost even more! Find out what some of the special features are in a machine like this that makes it so expensive.

2. Today's farmer, sitting in the cab of a tractor controlling it and the rig it pulls, is like a pilot in the cockpit of a plane. Explain this analogy.

3. "Today's food moves on rubber tires." In the course of a year, a farmer buys enough rubber in equipment to put tires on 7 million automobiles. Name all the equipment farmers use that require rubber, or list as many different ways you can that the equipment is put to use.

4. Research has found that in recent years farm output per man-hour has increased more than three times as fast as ouput per man-hour in industry. Explain how farm mechanization is responsible for this.

5. A large tractor and plow can plow a 60-acre field in just one day while a team of horses would plow only about 2 acres in one day. There are no horses to get tired anymore, just the farmer. How have modern machines lengthened the farmer's day? Why is this especially helpful during planting and harvesting seasons?

6. There are many specialized pieces of machinery, but most farmers can do many things with just one piece of farm equipment, the tractor. What are some of the many odd jobs a small utility tractor might do around the farm?

7. Not only does a farmer need to know how to operate modern farm machinery, he must also know how to repair it. "Down time" costs a farmer valuable time and money. Working around farm machinery can be dangerous. Farming is ranked third behind construction and mining as the most accident-prone career. Make a safety manual for farmers to help remind them of some simple but important rules of safety. You may wish to consult a farmer for ideas.

8. Farm machines can do a variety of things. Research the specialized equipment used in your area to cultivate and harvest the crops grown.

9. The dog may be a man's best friend, but the pickup truck is the farmer's best friend. If it could talk, just think what it might tell you about its busy life! Make a list of all the ways you can think of, that a pickup truck might be used on the farm. Be creative; how long can you make your list?

10. Many pickup trucks sport a bumper sticker that advertises the importance of agriculture, such as "Farming is Everybody's Bread and Butter". Create a new bumper sticker that expresses the importance and pride of North Dakota agriculture.

11. How efficient are machines? How do you mow your lawn? Clippers? Push Mower? Gasoline push mower? Riding mower? Discuss labor and time involved in each process.

12. Write, call or visit the nearest farm machinery company (Ford, Sperry-Holland, Allis Chalmers, John Deere, International Harvester, Massey Ferguson, Steiger, Versatile, White, Case, Melroe-Clark). Collect catalogs or brochures of farm machines. Use them for a bulletin board display.

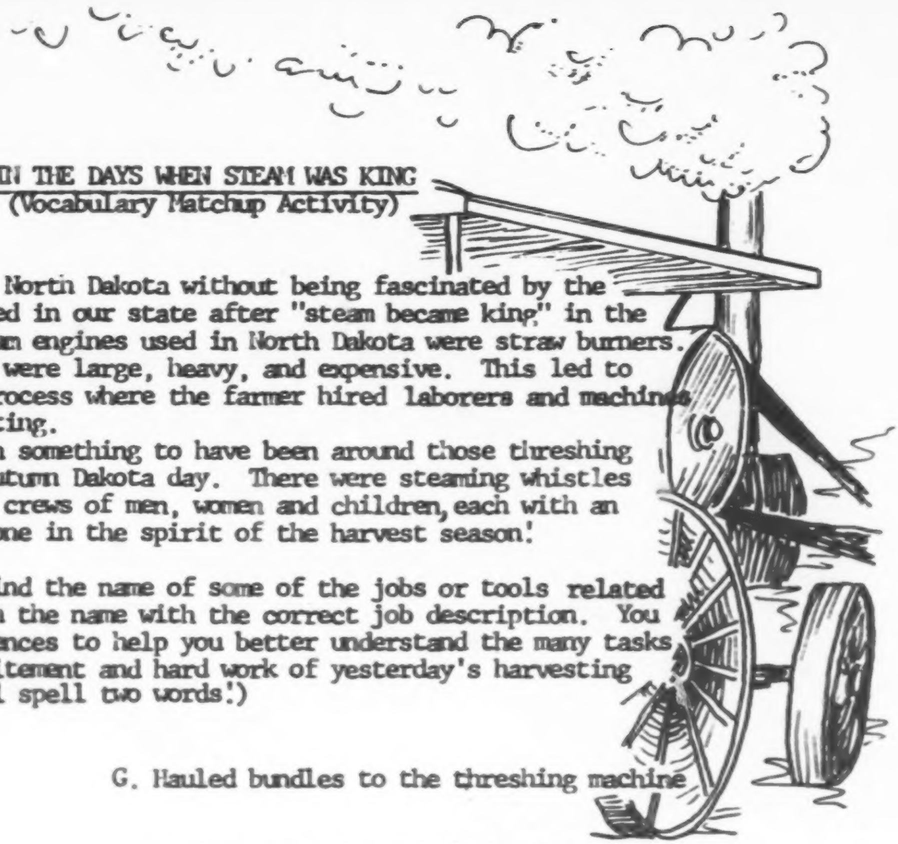
13. E. G. Melroe was a North Dakota farmer who developed an idea into a machine, and a machine into a manufacturing company. This all began in the tiny village of Gwinner, N.D. The company has now grown to be known as the Melroe Division of Clark Equipment Company, and is ranked among the top 200 corporations in the nation. It manufactures Spra-Coupes, windrow pickups, harrow multi-weeders and Bobcats.

    Doug and Maurice Steiger built their first tractor out on their farm near Red Lake Falls, Minn., during the winter of 1957-58. The four-wheel-drive tractors were soon being produced and sold to neighbors. Steiger Tractor, Inc., was purchased by an investor group and moved to Fargo, N.D., in 1969. The chartreuse-green Steiger tractors are still being built in Fargo in a large ten-acre manufacturing plant.

    Construct a collage of farm materials from these two North Dakota manufacturers.

14. Use encyclopedias and other references available in your school library to find development dates for each of the following:

    electricity
    tractor
    threshing machine
    plow
    grain combine
    fence
    mower
    cultivator
    grain drill
    reaper



IN THE DAYS WHEN STEAM WAS KING
(Vocabulary Matchup Activity)

One cannot study North Dakota without being fascinated by the threshing machines used in our state after "steam became king" in the 1880's. Most old steam engines used in North Dakota were straw burners. These steam threshers were large, heavy, and expensive. This led to custom threshing, a process where the farmer hired laborers and machines to help do the harvesting.

It must have been something to have been around those threshing machines on a crisp autumn Dakota day. There were steaming whistles and columns of smoke, crews of men, women and children, each with an important job to be done in the spirit of the harvest season!

Below you will find the name of some of the jobs or tools related with threshing. Match the name with the correct job description. You may need to use references to help you better understand the many tasks involved with the excitement and hard work of yesterday's harvesting machines. (Answer will spell two words!)

____1. Water monkey

____2. Separator man

____3. Straw monkey

____4. Fireman

____5. Field pitchers

____6. Spike pitchers

____7. Threshing bees

____8. Engineers

____9. Bundle hauler

____10. Grain hauler

____11. Cooks

____12. Binder

G. Hauled bundles to the threshing machine

B. Hauled away the threshed grain

E. Cut the grain in the field

T. Hauled water to the steam engine

R. Hauled straw to the steam engine

E. Kept the straw burning in the steam engine

H. Operated the separator

S. Helped load bundles of grain into the wagons

E. Prepared 3 hearty meals for the crew in the cook wagon

I. Are held today to recapture and keep alive the old skill of steam engine threshing

H. Unloaded bundles brought by haulers to the separator

N. Operated the steam engine

COMBINE: MACHINE WHICH SAVES TIME
(Student match-up activity)

The combine performs five basic jobs in harvesting that were once done by hand. One of the first successful combines built was by Hiram Moore of Kalamazoo, Michigan in the 1830's. This machine was pulled by 20 horses while it cut and threshed the wheat. Farmers during the 1880's used steam engines to power their combines. In the early 1900's these steam engines were replaced by internal combustion. Today, wheat producers may harvest their grain individually with their own machines, hire a professional combine crew, or contract with a neighboring farmer who has the necessary equipment. Some farmers share the harvesting of their crops in a cooperative effort. The combine reduced the man hours once required to harvest an acre of wheat from 46 hours to 30 minutes!! Imagine that!

Research the combine in the encyclopedia, reference books, or machinery pamphlets from local implement dealers.

Draw your own picture of a combine.

Match the five combine jobs
with the correct description.

CUTTING	(moves the cut grain into the thresher
FEEDING	(separate the stalk from) the grain
THRESHING	(extracts the whole grain) from its hull
SEPARATING	(separates the grain from) the excess particles
CLEANING	(cutting the crop from) the stalk

* *

Research some of the various tools or processes that have been used for harvesting in the past and are still being used today in some parts of the world. This might include frails, tribulum, and winnowing.

* *

INVENT A MACHINE
(Art project)

SUPPLIES: large paper old magazines colored markers

INTRODUCTION: You students who are now in school are very lucky! You can make most of the changes that the rest of this century will bring.

What will the world of the 2000's be like? Of course, no one can predict exactly. Changes are coming too fast, and many of the things to come will be surprises. Whatever the future holds, the prospect is both challenging and exciting!

By the end of the 80's there will be 24 million more people in the United States. That's enough people to fill the Louisiana Superdome 320 times!!

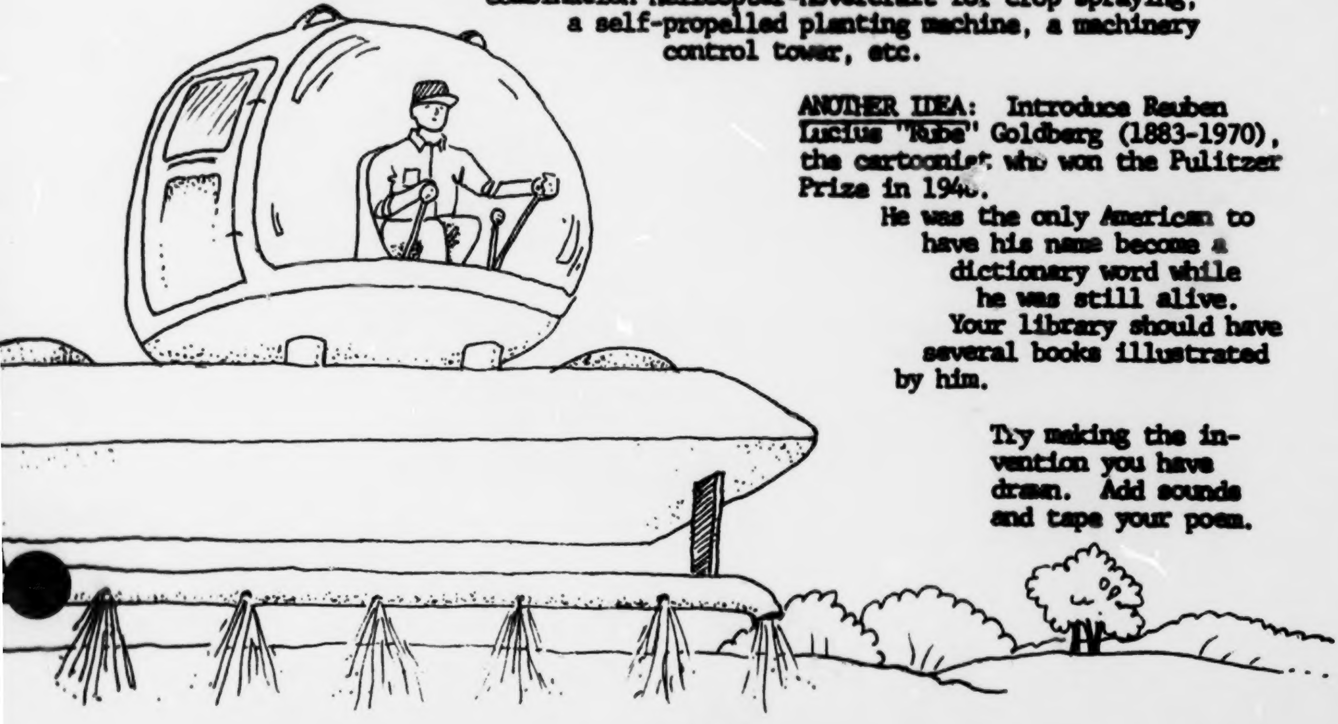
What will all these people eat? Use your imagination! Try to invent a new farm machine which will have the impact on agriculture that McCormick's machine made in 1843.

PROCEDURE:

I. Read the poem, "The Homework Machine," by Shel Silverstein. Discuss how the author leads you through the mechanics of the working machine.

2. Brainstorm several machine parts that could be used in their own invention. Place these on the chalkboard.

3. Discuss the quotation, "Necessity is the mother of invention." What kind of machine do you think the farm needs, both silly and sensible? List several ideas to get the students started. For example: an atomic tractor, a mechanized robot egg picker, a combination helicopter-hovercraft for crop spraying, a self-propelled planting machine, a machinery control tower, etc.



ANOTHER IDEA: Introduce Reuben Lucius "Rube" Goldberg (1883-1970), the cartoonist who won the Pulitzer Prize in 1948. He was the only American to have his name become a dictionary word while he was still alive. Your library should have several books illustrated by him.

Try making the invention you have drawn. Add sounds and tape your poem.

INVENTORS AND INVENTIONS

(Research activity)

SUPPLIES: Ditto of Inventors and Inventions

INTRODUCTION: The land remains and the weather changes as ever, but the techniques of agriculture have moved dramatically into the technological age. There have been at least three agricultural revolutions in the last few hundred years; two in America and one in England. Each revolution was the result of new inventions and discoveries for farming. They all had the same result: Farmers could produce more and more food.

PROCEDURE:

1. Using the list of inventors and inventions found on the following page, have the students select a topic.
2. Find out as much as you can about the invention you chose. For example:

   Who invented it? When? Where?

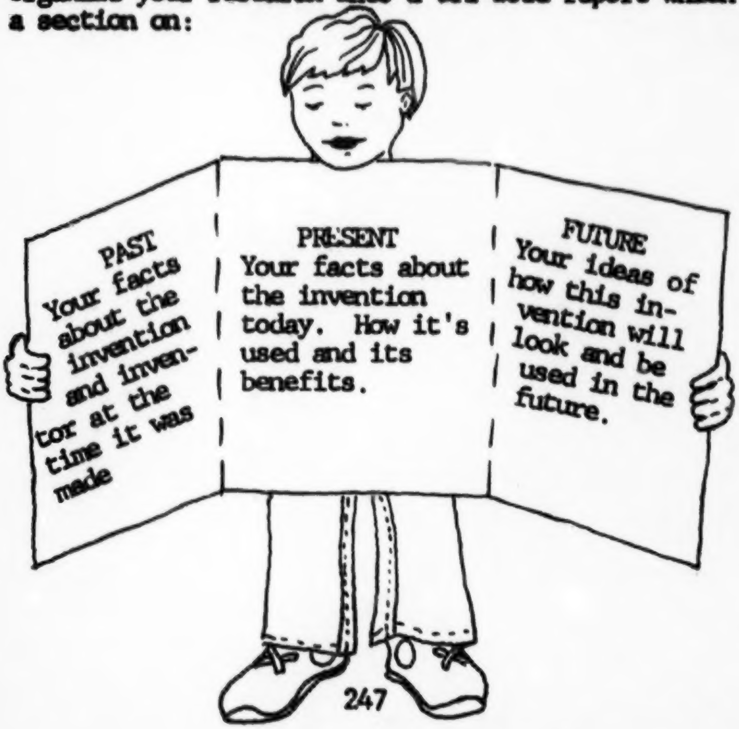
   Why was it invented? How has it changed?

   Was it accepted when it was invented? Why or why not?

   How is it used today? What future does it have?

   What influence has it made on other things?

3. Organize your research into a tri-fold report which includes a section on:


PAST
Your facts about the invention and inventor at the time it was made
PRESENT
Your facts about the invention today. How it's used and its benefits.
FUTURE
Your ideas of how this invention will look and be used in the future.

INVENTORS AND INVENTIONS

Agriculture

INVENTION	INVENTOR	YEAR
Cotton gin	Eli Whitney	1793
Steel plow	John Deere	1837
Reaper	Cyrus McCormick	1843
Barbed wire	Joseph F. Glidden	1873
Vacuum milker	Anna Baldwin	1878
Tractor	Benjamin Holt	1904
Gas engine	Jean Lenoir	1860
Electric light	Thomas A. Edison	1810
Frozen food process	Clarence Birdseye	1925
Canned foods	Nicolas Appert	1787
Air conditioner	Willis H. Carrier	1915
Refrigerator	Jacob Perkins	1834
Telephone	Alexander Bell	1876
Telegraph	Samuel Morse	1840
Radio	Lee de Forest	1888
Steam locomotive	Richard Trevithick	1804
Airplane	Orville & Wilbur Wright	1903
Pneumatic tire	Robert W. Thomson	1845
Margarine	Hippolyte Mege Mouries	1869
Microscope	Zacharias Jensen Neth	1590
Vulcanized rubber	Charles Goodyear	1839
Pasteurization	Louis Pasteur	
Internal combustion engine	Rudolf Diesal	

BEST COPY AVAILABLE

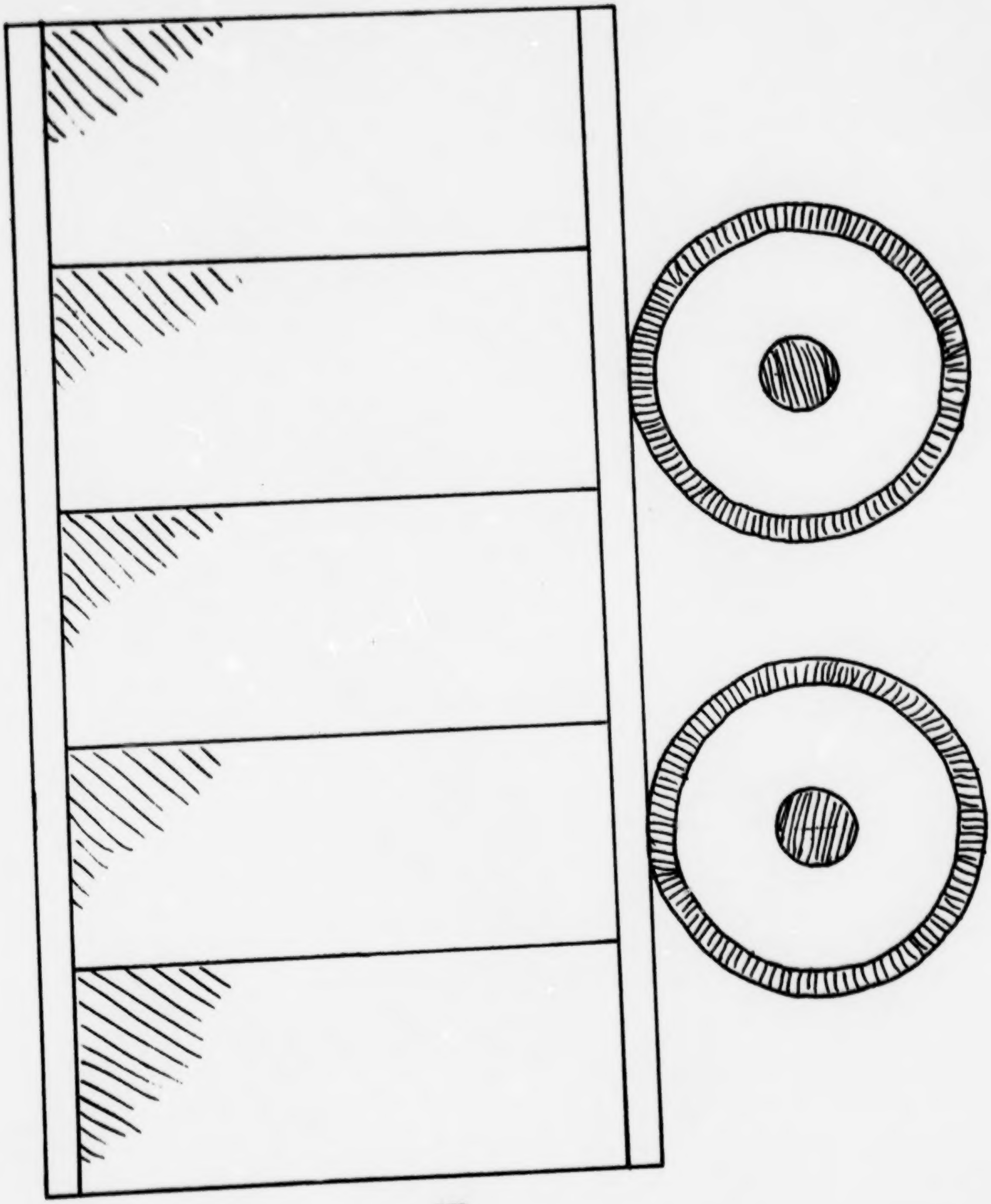
RAILROADS FARMERS MARKETING

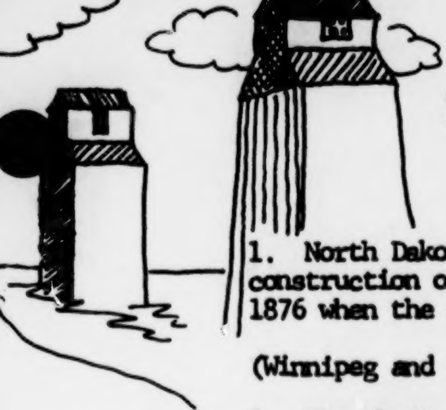
HOPPER CARS	UNITED STATES DEPARTMENT OF AGRICULTURE	LOCOMOTIVES	FEDERAL LAND GRANTS	FARM BUREAU, FARMERS UNION AND NATIONAL FARMERS ORGANIZATION
FIRST TRANS-CONTINENTAL RAILROAD	NORTHERN PACIFIC	FREIGHT	1872	SEED, CHEMICALS, FERTILIZERS, FARM SUPPLIES
RAIL OR GRAIN CAR SHORTAGE	JAMES J. HILL	COUNTRY GRAIN ELEVATORS	TRUCKS AND STOCK CARS	EAST-WEST
MARKET	INTERSTATE COMMERCE ACT	CLEANING AND SHIPPING GRAIN	BURLINGTON NORTHERN	GRANGE LAWS

RAILROADS, FARMERS, MARKETING
(Definition Cards)

Cars used to haul bulk freight	A federal government agency which provides information to farmers	Head of a train which pulls the other cars	Grants given to railroads by the governments	Organizations of North Dakota farmers
Connected the east to the west	First railroad in North Dakota	Goods transported as cargo	The year the first train appeared in North Dakota	Some products sold by local elevators
Can occur at harvest time	Founder of Great Northern Railroad	A business usually located near railroads	Used to transport cattle and other livestock	Direction which most tracks were built
A public place where goods are sold	Regulates certain economic practices of railroads	Services provided by local elevators	Nation's longest railroad	Legislation passed to regulate railroad rates

RAILROAD, FARMER, MARKETING TASK CARD





RAILROADS AND FARMERS AND MARKETING

1. North Dakota's marketing story began in the 1870's with the construction of the railroad. Commercial grain trade started in 1876 when the rail line was built between what two cities?

(Winnipeg and St. Paul)

2. The wheat grown in North Dakota's Red River Valley in the 1870's grew in demand in areas such as New York, eastern Canada and even England. Railroads were one of the reasons. We now could get our grain to what large flour milling center?

(Minneapolis)

3. Railroads grew rapidly, and by 1885 nearly all parts of the Red River Valley were within fifteen miles of a railroad!! With careful planning the railroads were constructed so that no farmer was more than how many miles from a railroad track?

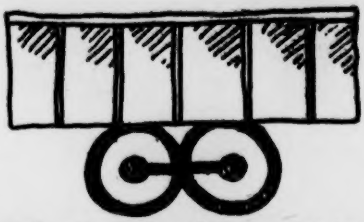
(25 miles)

4. Throughout our state, farmers haul their grain to a local elevator which is located by a railroad track. Next time you see a grain elevator, look to see if there is a railroad track next to it.

5. The railroads and grain dealers must work together to see that North Dakota's agricultural products get to market. A breakdown between the two would greatly affect you and your dinner table!

6. North Dakota's agricultural growth is closely linked to the development of the railroads in our state. Much credit needs to be given to James J. Hill. Hill actually changed the face of America as well as North Dakota. Research this great contributor to North Dakota's agricultural greatness. Write a biography for the Grass-roots newspaper.

7. Just after the Civil War, a good way to get rich was to start a railroad in the West. Railroad promoters would go to Congress or the state legislature to get a charter, a loan of public funds and a land grant. In the 1850's, the United States government gave huge tracts of free land to such railroad companies. Research the First Federal Land Grants.



RAILROADS Task Cards continued

8. The early settlers to the Dakotas found not only the hardships of Mother Nature unfriendly but also the railroads. Farmers began to complain when the freight rates they had to pay to get their crops to market continued to rise!

9. The railroads in the 1870's had a real monopoly. Most states were served by a single railroad, and thus the company could charge very high freight rates. Something had to be done, but what? What would you have done if you were a farmer who was being exploited by the railroad?

10. Later on when more railroads were built, rather than helping the farmers, a new evil appeared. Now the rates went down as competition appeared, but farmers now suffered under the rebate system. What is rebate? How did it affect the small farmer?

(Large shippers on railroads would receive lower rates than those paid by small farmers with little influence)

11. Farmers in those early days were not being treated fairly! But, as they worked to conquer the Plains, so did they fight for fair treatment! Many farmers banded together in a group known as the National Grange of the Patrons of Husbandry. Research the "Grange." What things did this united group work for?

(They elected their own representatives to state legislature and many laws were passed to aid them)

12. The railroads fought back by hiring lawyers of their own to fight the so-called "Grange" laws. The United States Supreme Court handed down a decision which affected railroad rates! What was that decision?

(The Supreme Court said state legislatures had no control over the rates charged by railroads which operated in two or more states. Thus the Grange laws were now worthless!)

13. The farmers did not stop with their own states; they took their complaints to Congress. After an investigation, what did the congressional committee find?

(They found that the railroads had been guilty of many dishonest practices including the bribing of judges and state officers)

14. What did Congress create in 1887 because of the investigation into the Grange Laws.

(Interstate Commerce Commission)

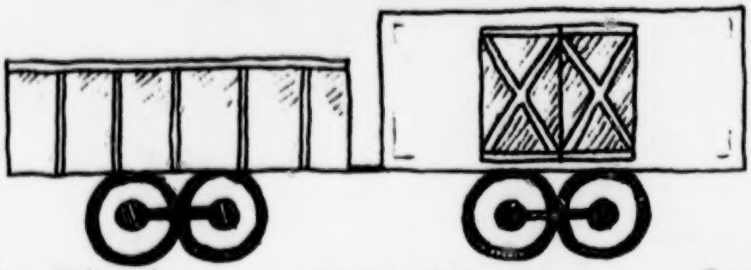
15. Who is Oliver Hudson Kelley? Research the Grange organization and find out about its early history.

16. The Grange came to North Dakota in 1914, largely in the counties west of the Missouri River. Eventually the rise of the Nonpartisan League helped to kill the Grange in North Dakota.

17. Railroading is one of the most efficient means of transporting North Dakota-grown crops to market. What are some other means of transportation used to get our crops to market? What makes the railroad so efficient in comparison to other means of transportation?

(semi trucks)

RAILROADS; FARMING FREIGHT



SUPPLIES: tagboard construction paper reference books

INTRODUCTION: Ninety-five percent of all the money earned by railroad companies is earned from hauling freight. Every day, as many as 10,000 freight trains cross the U.S. countryside carrying everything from wheat to new combines. The longest freight trains may have 200 or more cars, with the average freight train having about 70 cars.

Freight cars come in many different shapes and sizes according to the particular freight they were designed to haul. A freight train leaving North Dakota bound for Minneapolis could be made up of several types of cars!

PROCEDURE:

1. Discuss the various types of railroad cars and their description and use. The encyclopedia is a good reference.
2. List all the North Dakota products that could possibly be hauled by a freight train bound for out of state.
3. Match with the list the specific type of car that could be used to haul this North Dakota product.
4. Now create a freight train called the "North Dakota Agriculture Express."
5. Make large drawings of the different freight cars or use the opaque projector to enlarge drawings from a reference book. (You might wish to use the task card shape).
6. Print on each special car the type of railroad car it is and the North Dakota product it is carrying.
7. Hook them all together complete with engine and caboose. How long can you make your train?
8. Encourage colorful detailed drawings and descriptions.
9. Link up the cars and display it in the hall for others to see that North Dakota agriculture is on the right track!

ANOTHER IDEA: Create another freight train bound for North Dakota with agricultural-related freight. For example, machinery, fertilizers, etc.

-Invite a railroad person or grain dealer to your classroom as a guest speaker.

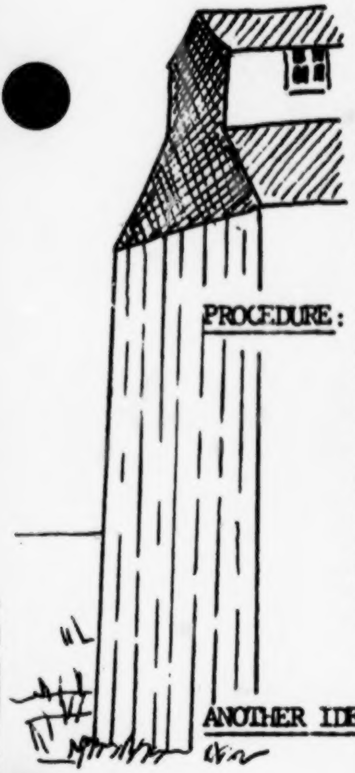
-Create a "junk art" North Dakota rural setting complete with the railroads, elevators, fields, farms, ranches, etc.

THE GRAIN ELEVATOR

SUPPLIES:
empty milk cartons or Pringle cans
tempera paint or aluminum foil
liquid dish detergent

INTRODUCTION: Traveling through North Dakota's rural setting, many different scenes come into view. One sight often seen is the tall grain elevators standing next to the railroad tracks, reaching up toward the North Dakota sky. The grain elevator got its name from the fact that grain is raised or "elevated" to the top of a high tower and dropped into it for storage.

There are two basic types of grain elevators--country and terminal. Country elevators receive the grain from the farmers. Here it is cleaned, conditioned, and graded before it is shipped by railroad cars to the large markets. Terminal elevators are located at large market and shipping centers such as Chicago, Minneapolis, Duluth, and Kansas City, Missouri. From these places grain is shipped via the Great Lakes and overseas to far-off places.



PROCEDURE:
1. This art activity may be used alone or with the "Railroad: Farming Freight" project.
2. Paint milk cartons or Pringle cans gray or white to simulate a grain elevator.
3. Add liquid dish detergent to the tempera paint to help it adhere to the surface of wax containers.
4. Aluminum foil may be used instead of paint to cover the elevators.
5. Cut out black construction paper letters spelling the name of the town where the elevator is located and glue them on the building.
6. Place the completed elevators in your railroad "junk art" setting. Add some toy trucks to the scene, etc.

ANOTHER IDEA: Construct some grain bins like farmers sometimes use to store grain on their farms.

Plan a field trip to the nearest grain elevator in your community.

Map out the route by which North Dakota grain is transported out of state and shipped to other parts of the world.

FROM FARM TO MARKET

SUPPLIES:

"From Farm to Market" (Student ditto)
"Farm to Market Cycle Sheet"
scissors
paste

INTRODUCTION:

Marketing is a system of businesses that takes a product, such as wheat, from the farmer's field to the consumer's table. It is a complex system that involves transportation and storage of products, time and methods of selling, prices, politics, foreign markets, manufacturing, packaging, and wholesale and retail sales.

North Dakota's marketing story began in the 1870's with the construction of the railroad. Commercial grain trade started in 1876 when a rail line was built between Winnipeg and St. Paul. The demand for Red River Valley wheat grew in New York, eastern Canada, and England, and helped make Minneapolis the largest flour milling center in the U.S.

The railroads grew. By 1885, nearly all parts of the Red River Valley were within fifteen miles of a railroad. Railways were planned so that no farmer was more than twenty-five miles from a railroad track.

Today, farmers haul their grain to a local elevator, which is located by a railroad track. An elevator is the place where farmers store and sell their grain. (The elevator gets its name from the fact that the grain is raised or elevated to the top of a high tower and dropped into it for storage.)

First the farmer's grain truck is weighed with its load. Then the grain is dumped through an iron grate and into an underground bin. From there the grain is conveyed to the tall bins. The truck is weighed again and the difference between the first weigh-in and the second is the weight of the load of grain.

After the grain is sold, it is shipped to market by railroad or grain trucks. Sometimes the grain goes to a flour mill; other times it is shipped to big grain storage depots that have elevators many times larger than the local elevators. Many railroad cars, river barges, trucks, and steamships are involved in transporting the grain harvest.

North Dakota-grown crops are exported to many parts of the globe. North Dakotans can be proud of the number of people throughout the world our farmers help to feed.

PROCEDURE:

1. Provide each student with a copy of the worksheet entitled "From Farm to Market" and an "Farm to Market Cycle Sheet."

2. Read the class the following set of directions.

> Today you are going to pretend you are a North Dakota-grown grain. Trace the steps you would undergo from planting to being exported. Study the illustrations on your ditto. Cut them out and arrange them according to the proper sequence in the spaces provided.

3. Allow students time to place the illustrations in the spaces provided.

4. Once all the students have finished, discuss their answers. Come to a group consensus about the best order for the cycle. The suggested answers are as follows:

1. Seed bag
2. Planted field
3. Growing Wheat
4. Harvesting
5. Local Elevator
6. Transportation
7. a) Mill
   b) Port
8. The World

5. You may wish to discuss with the students why number seven has two answers.

Lead a discussion on what happens to the grain once it leaves the elevator. It could be transported to the mill to be made into flour or taken to port to be exported abroad.

6. The students can now paste their illustrations in the correct spaces... thus completing their cycle.

ANOTHER IDEA:

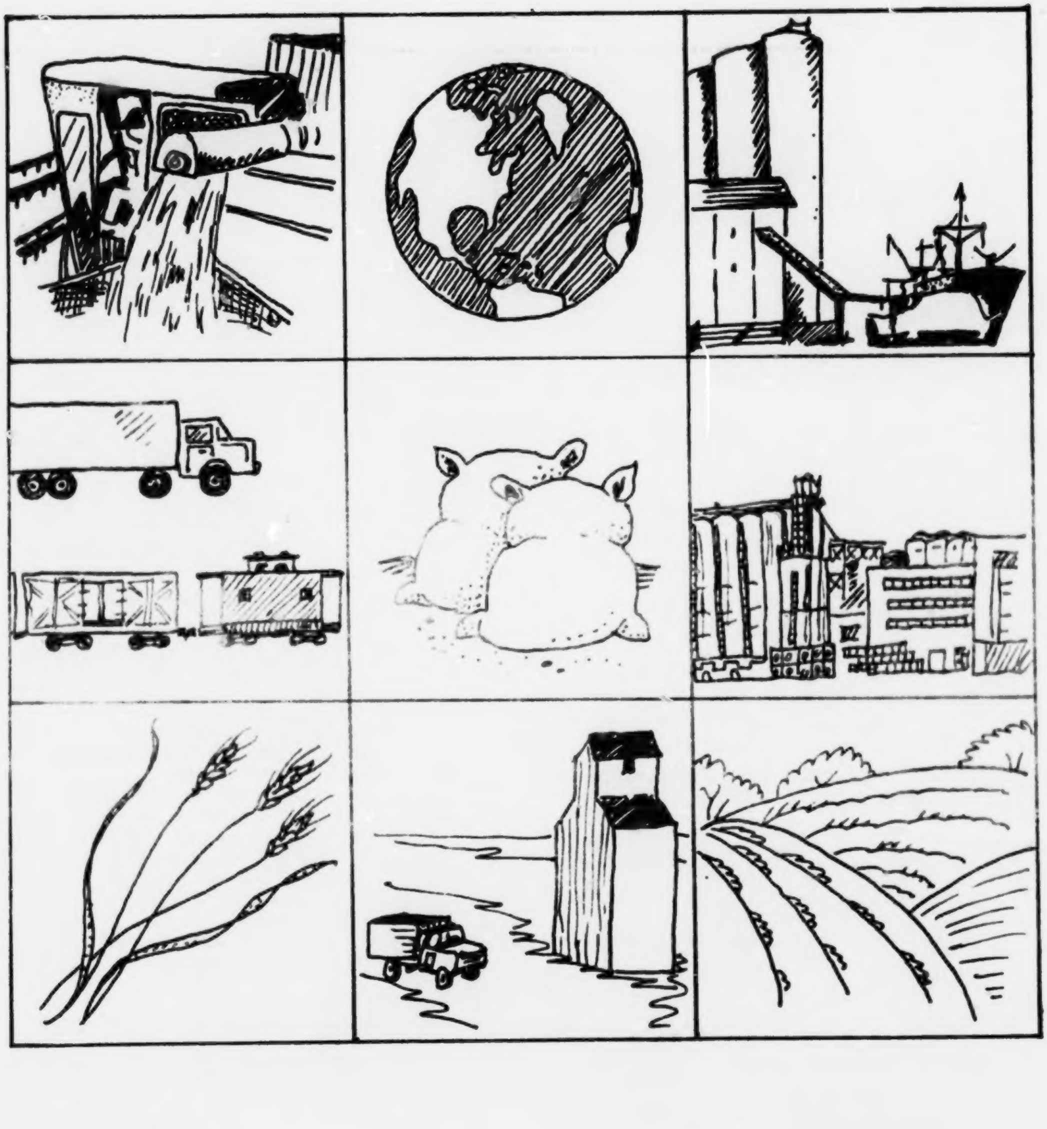
- This could be the beginning of a more complex flow chart. Students could make such a pictorial story of all our N.D. crops.

- Visit your local grain elevator. Find out the facts first-hand.

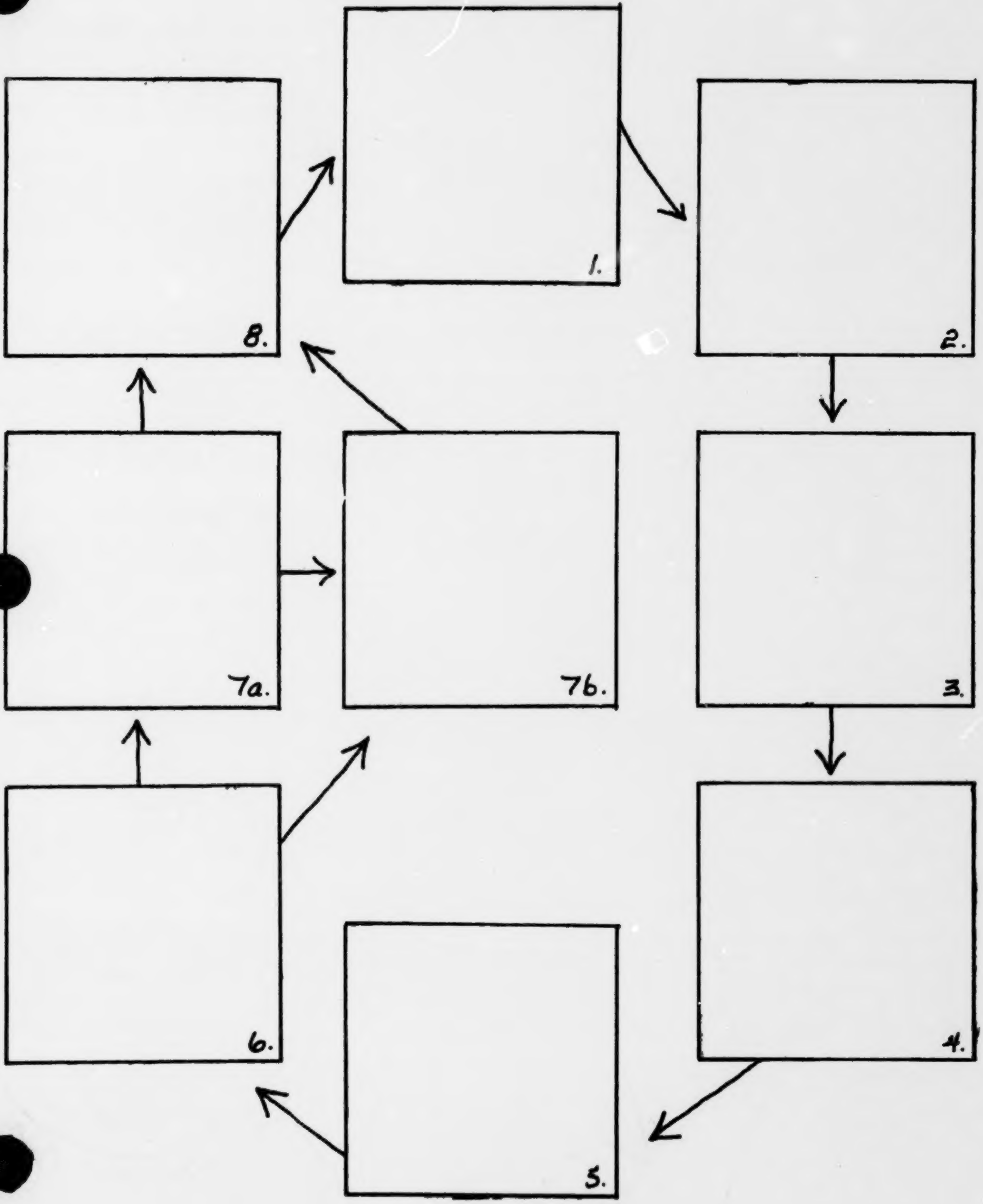
- Why is this a cycle? What would happen to disrupt the cycle? (Ex: drought or truckers strike)

- Invite a politician or farmer who has gone abroad to promote the sale of grain into the classroom to speak.

"FROM FARM TO MARKET" STUDENT DITTO

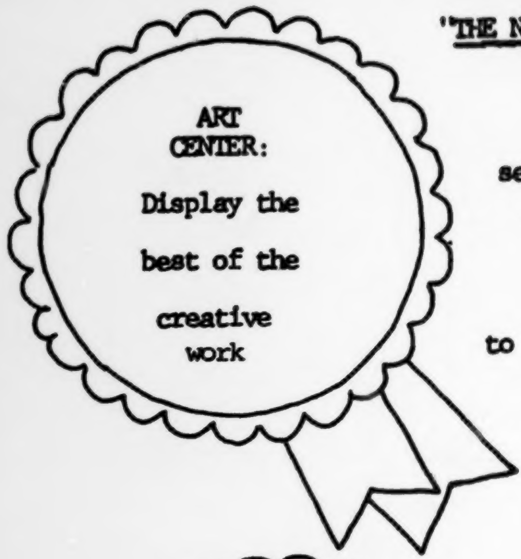


"FARM TO MARKET" CYCLE SHEET.


1.
2.
3.
4.
5.
6.
7a.
7b.
8.

"THE NORTH DAKOTA COUNTY FAIR"

As you finish up
several of the projects
listed in this book
you may wish
to "stage" a county fair
in your school.
Listed
on the ribbons
are a few ideas
to get you started.

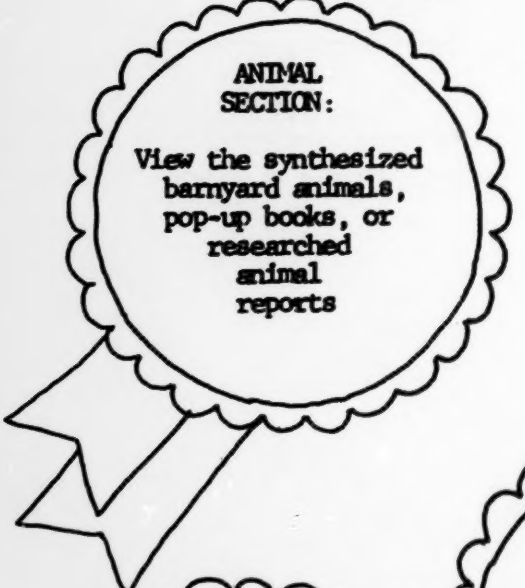


ART CENTER:

Display the best of the creative work

HALL OF FARMING FAME:

Share these winners with the rest of the school



ANIMAL SECTION:

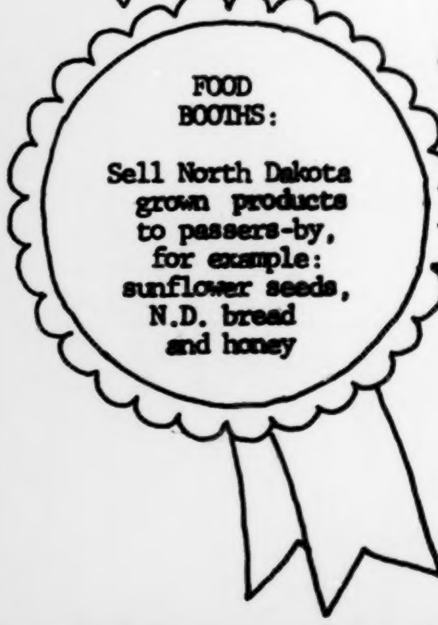
View the synthesized barnyard animals, pop-up books, or researched animal reports

CAREER SCOPES:

Look into the many agriculture connected careers

COOKING CORNER:

Feature recipes and dishes by North Dakota cooks



FOOD BOOTHS:

Sell North Dakota grown products to passers-by, for example: sunflower seeds, N.D. bread and honey

CROP CLUE GAME:

Test your knowledge at identifying N.D. grown crops

COUNTY FAIR CULMINATING ACTIVITY

CRAFTS:

Quilting,
Wheat Weaving,
Paper Moons

You might wish to
send out invitations
to several special persons
such as other classrooms'
parents and relatives.
A "blue ribbon invite"
might be
just right!!

PLANTS:

Show off your
potato heads
or
bean plants

GRASSROOTS REPORTER:

Compile a newspaper
to hand out at
your fair.

MACHINERY:

New Machines of the Future!

Replicas of the Past!

Pictures of the Present!

INVITATION:

You are cordially
invited to our
County Fair....

. . .

JUDGING:

Award ribbons as
selected by a
panel of
judges

GRANDPAPPY OLSON:

Display the old
antiques and share the
new ideas for
their uses.

ANSWER KEYS

Page 41, A CAREER"IST" SEARCH

1. A
2. P
3. D
4. Q
5. H
6. R
7. K
8. B
9. O
10. G
11. C
12. N
13. L
14. E
15. F
16. M
17. J
18. I

Page 64, GRANDPAPPY OLSON'S TRUNK

1. Sawbuck
2. Steam engine
3. Water pump
4. Barbed wire fence
5. Stone boat
6. Pitchfork
7. Outhouse
8. Haymow
9. Flat iron
10. Cream can
11. Plow
12. Grindstone
13. Wash tub
14. Butter churn
15. Cistern pump
16. Grain scoop
17. Horse collar
18. Coal scuttle
19. Whippletree
20. Grain sacks
21. Milking stool
22. Ash pan
23. Karo syrup can
24. Lantern

Page 88, WHICH WHEAT WHERE

1. D
2. F
3. H
4. J
5. B
6. K
7. I
8. G
9. E
10. A
11. C

Page 209, SPECIALTY CROPS

1. S
2. P
3. E
4. C
5. I
6. A
7. L
8. T
9. Y

Page 232, CHEMICALS: THE FARMER'S FRIENDS

1. Fertilizer — a substance that puts nutrients into the soil
2. Nutrients -- essential for growth
3. Manure — waste used to fertilize soil
4. Chemical — fertilizers or pesticides
5. Insecticide — a chemical which kills insects
6. Herbicide — a chemical which kills weeds
7. Fungicide — a chemical which kills fungi (disease)
8. Pesticide — a chemical which kills any pest of a crop
9. Leafy spurge — a weed
10. Potato blight — a fungi
11. Organic farmer — one who uses no commercial fertilizers or pesticides
12. BCA — biological control agent
13. Rust — a grain-killing fungi
14. Grasshoppers — crop-destroying insects

USEFUL REFERENCES

North Dakota Department
of Agriculture
State Capitol
Bismarck, North Dakota 58505

National Sunflower Association
1501 North 12th
P.O. Box 2533
Bismarck, ND 58502

North Dakota Beef Commission
107 South 5th Street, Room 13
Bismarck ND 58505

North Dakota Dairy Council
Rt. 5, Box 8
Bismarck, ND 58505

Red River Edible Bean Growers Association
Rural Route, Box 102
Frazee, MN 56544

Red River Valley Potato Growers Association
P.O. Box 301
East Grand Forks, MN 56721

Red River Valley
Sugarbeet Growers Association
1701 38 Street SW
Fargo, ND 58103

USEFUL REFERENCES, continued

National Barley Growers Association
Rural Route
Osnabrock, ND 58269

Honey Promotion Commission
N. D. Department of Agriculture
Sixth Floor State Capitol
Bismarck, ND 58505

North Dakota Mill and Elevator
P. O. Box 1078
Grand Forks, ND 58202

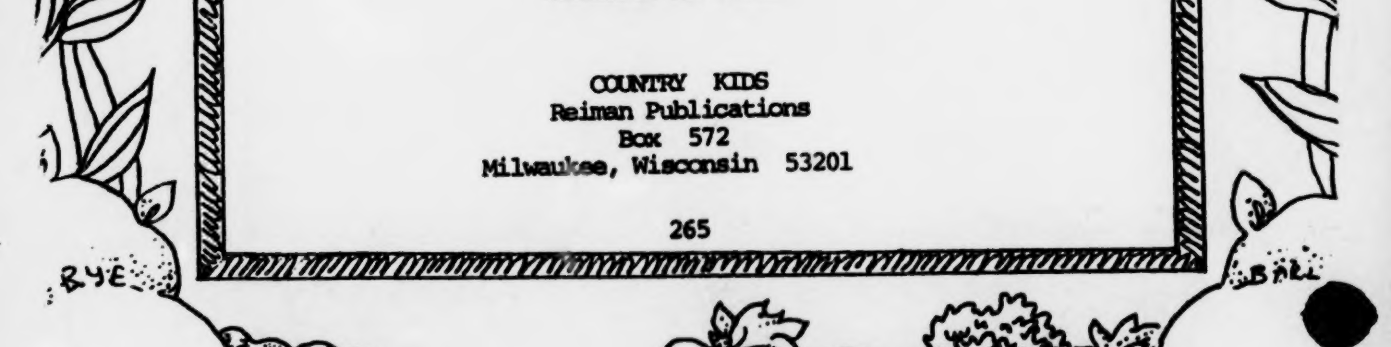
Country Style
by Ralph Scott
Box 1952
Jamestown, ND 58401

PROJECT STUDY
N.D. Department of Public Instruction
State Capitol
Bismarck, ND 58505

"Center Your Year Around North Dakota"
N.D. Department of Public Instruction
State Capitol
Bismarck, ND 58505

North Dakota Wheat Commission
1305 East Central Avenue
Bismarck ND 58505

COUNTRY KIDS
Reiman Publications
Box 572
Milwaukee, Wisconsin 53201



1993 Corrections to
CREATIVE WAYS TO CULTIVATE AGRICULTURE IN THE CLASSROOM

Page 6 -

line 2 - One North Dakota Farm Family feeds 128 people - 94 in the U.S. and 34 overseas!

line 5 - One out of every 49 people in the United States is a farmer!

line 6 - One chicken lays about 275 eggs a year!

line 7 - A single bushel of wheat (60 lbs.) will make about 70 loaves of wheat bread (1 lb. each)!

line 8 - An average dairy cow produces 87 8-oz. glasses of milk each day!

line 9 - A calf born today will be ready for market as a beef animal in 14-16 months!

line 14 - The average American ate 66.5 pounds of beef in 1992! (retail weight basis)

line 15 - The average American ate 30 pounds of hamburger in 1992! (retail weight basis)

Page 35

line 4 - Did you realize that 18 percent of all the jobs, occupations and careers in our country have something to do with agriculture?

Page 36

line 18 - If it is about 18 percent, your class is within the national average.

Page 51

line 5 - Replace "1984" with "today".

Page 78

line 38 - There are 13 companies with 23 durum mills in the U.S., and the North Dakota Mill & Elevator is the 5th largest.

Page 107

line 2 - In 1992 alone, 21,800,000 pounds were produced!

Page 109

Educational materials including video cassette tapes and films, about the cattle industry are available. Contact your regional teacher learning center or the ND Beef Commission at 221-5120 if you are interested in obtaining this information.

Page 135 - four across and three down should be 275

Page 139

line 11 - The Cando Egg Plant is no longer in operation. North Dakota Egg Producers had flocks totaling 176 thousand laying hens in 1992. These hens produced 41 million eggs.

Page 143 - lower left block should read 9.2 pounds, not 9 pounds. (1992 figure)

Page 147

#11 - The average sheep's fleece weighs 9.2 lbs. (1992 figure)

Page 151

line 8 - have six livestock (if the number of cattle, sheep, hogs, chickens and turkeys is totalled.

Page 152 - Beef Cattle

Angus
Shorthorn
Hereford
Red Angus
Red Poll
Brahman
Blonde d' Aquitaine
Brangus
Polled Hereford
Santa Gertrudis
Charolais
Simmental
Saler
Gelbvieh
Limousin
Ghianina
Main Anjou
Galloway
Tarentaise

Page 158 - The eighth question should read "Why are beets red?"

Page 163

#12 - The number of pounds of barley harvested in ND in 1992 is 8,268,000,000

(172,250,000 bushels - 3,751,361 MT)

Page 176 - 3 blocks across, 3 blocks down

North Dakota ranked second in U.S. production in 1993.

Page 179

#13 - Would you believe that 22,615,000 cwt of edible dry beans were produced in the U.S. in 1992?

Page 183 - Top right hand corner should be Grand Forks, not Park River

five across and two down -- should be #7

Page 184 - Top right hand corner should read location of potato flake plant

five across and two down -- should be 1993

Page 191 - 2 down - Southeast

Page 192 - 2 down - Location of most soybean production in North Dakota

Lower right-hand corner - produces 51 percent of world's supply of soybeans. (1992 figure)

Page 194

#6 - The U.S. produces 51 percent of the world's soybeans.

Page 197 - two across and three down -- 5th in the nation

Page 198

2 across - 3 down - Production ranking in 1993.

Page 199

#3 - (Drayton, Hillsboro, Wahpeton - ND
East Grand Forks, Moorhead, Crookston - MN
Sydney, MT)

Page 200

#11 - Write to the American Crystal Sugar Company at
101 N 3rd, Moorhead, MN 56560

#12 - What ranking did North Dakota sugar beet production have in 1993? 5th in nation

Page 202 - 5 across - 2 down

1993 Production Nationwide

Page 204

#1 - How did our state rank in 1993? 1st in nation

Page 212

Sunflower - ranked #1 in 1993 production

Sugarbeets - ranked #5 in 1993 production

Wheat - ranked #1 in durum production in 1993
ranked #1 in hard red spring wheat production in 1993
ranked #2 in all wheat production in 1993

Flax - ranked #1 in 1993 production

Potatoes - #7 in 1992 production

Barley - 1st in 1993 production

Dry Edible Beans - 2nd in 1993 production

Page 239 - 4 across - 3 down

1793

Page 242

#1 - A powerful, 4 wheel drive tractor can cost as much as $100,000.

Page 243

#13 Doug and Maurice Steiger built their first tractor out on their farm near Red Lake Falls, MN during the winter of 1957-58. The four-wheel drive tractors were soon being produced and sold to neighbors. Steiger Tractor moved its operations to Fargo in 1969. In 1986, Steiger Tractor, Inc. was acquired by J.I. Case, a Tenneco company. These tractors are built in a 10-acre manufacturing facility.

Page 245

World population is projected to double in the next 60 years, with the largest increases in less developed regions, and slow growing or declining populations in most industrialized nations.

In 1988, world population broke the 5-billion mark. It was expected to top 5.1 billion--growing at a rate of roughly

24,000 people per day, or 88 million a year.

By the year 2050, the world population will be approaching 11 billion.

Page 264

National Sunflower Association
4023 North State Street
Bismarck, ND 58501

ND Beef Commission
4023 North State Street
Bismarck, ND 58501

ND Dairy Promotion Commission
4023 North State Street
Bismarck, ND 58501

Northarvest Bean Growers Association
RR 3, Box 520
Frazee, MN 56544

Page 265

ND Barley Council
415 38th Street SW
Fargo, ND 58103-1113

ND Wheat Commission
4023 North State Street
Bismarck, ND 58501